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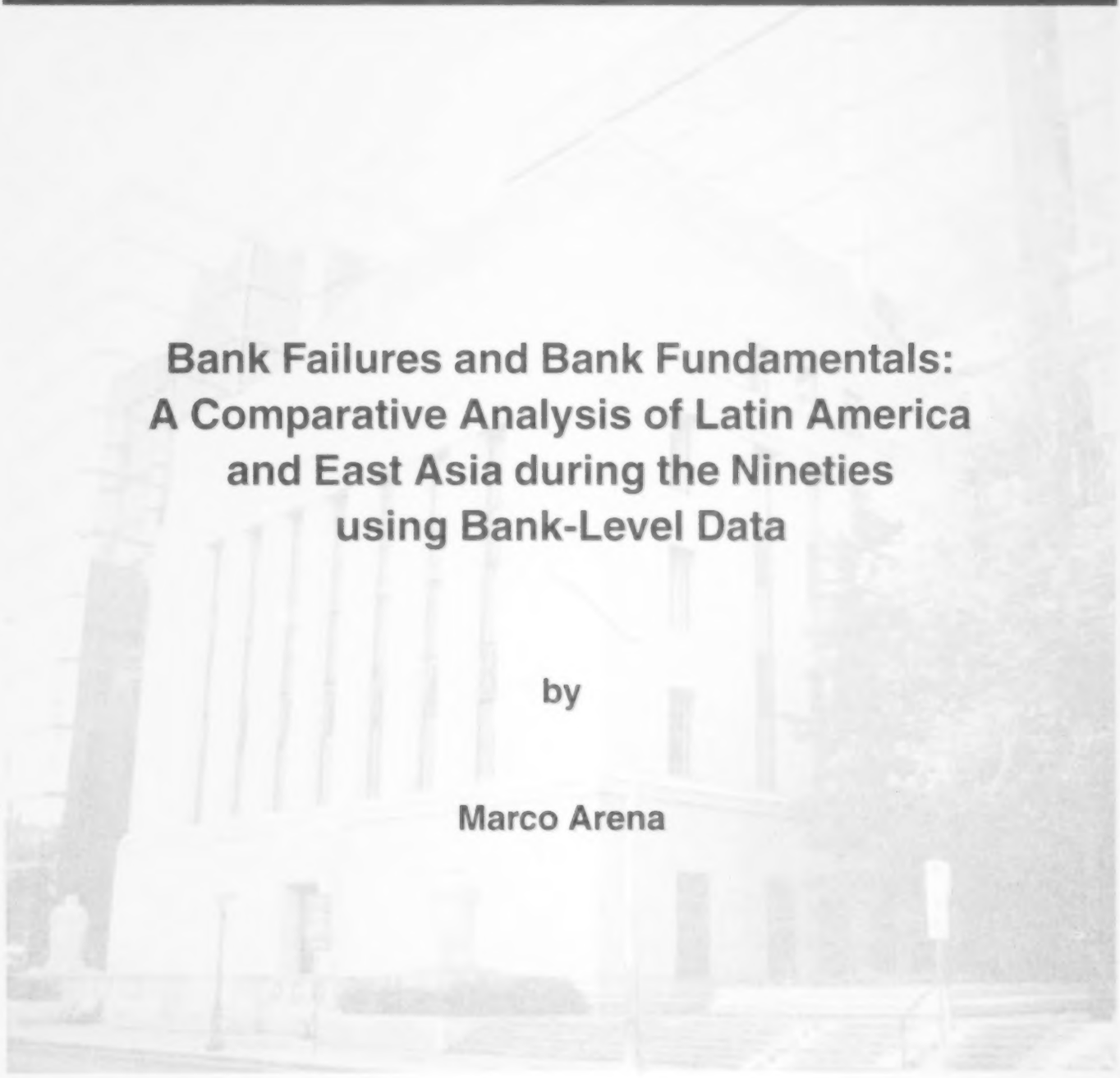
Bank Failures and Bank Fundamentals: A Comparative Analysis of Latin America and East Asia during the Nineties using Bank-Level Data

by

Marco Arena



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The views expressed in this paper are those of the author.
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Contents

Acknowledgements iv
Abstract/Résumé v

1. Introduction 1

2. Review of Related Literature 3

3. Data Description 6

   3.1 Description of the variables 7

4. Methodology and Empirical Evidence 9

   4.1 Definition of failure 10
   4.2 Characteristics of failed and non-failed banks 11
   4.3 Probability of failure: cross-sectional logit estimation 12
   4.4 Distributional analysis of propensity scores 14

5. Conclusions 18

References 20

Tables 24

Appendixes 34

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Abstract

The author develops the first comparative empirical study of bank failures during the nineties between East Asia and Latin Ameri a using bank-level data, in order to address the following two questions: (i) To what extent did individual bank conditions explain bank failures? (ii) Did mainly the weakest banks, in terms of their fundamentals, fail in the crisis countries? The main results for East Asia and Latin America show that bank-level fundamentals not only significantly affect the likelihood of bank failure, but also account for a significant proportion of the likelihood of failure for failed banks. Systemic shocks (macroeconomic and liquidity shocks) that triggered the banking crises mainly destabilized the weakest banks ex ante, particularly in East Asia. This finding raises questions about regional asymmetries in the degree of banking sector resilience to systemic shocks.

JEL classification: G2, N2
Bank classification: Financial institutions

Résumé

Il s'agit de la première étude empirique où l'on compare les défaillances bancaires survenues dans les années 1990 en Asie orientale et en Amérique latine à la lumière de données recueillies au niveau des banques. L'auteur tente de répondre à deux questions. Premièrement, dans quelle mesure la défaillance d'une banque était-elle liée à sa situation financière? Deuxièmement, les banques défaillantes dans les pays en crise étaient-elles généralement les plus fragiles d'après leurs indicateurs fondamentaux? Selon les principaux résultats obtenus pour ces deux régions, non seulement les paramètres fondamentaux d'une banque ont une incidence significative sur la probabilité de faillite, mais ils expliquent une bonne partie de celle-ci dans le cas des banques défaillantes. Les chocs systémiques (chocs macroéconomiques et de liquidité) qui ont déclenché les crises bancaires ont surtout déstabilisé les banques les plus vulnérables a priori, particulièrement en Asie orientale. Cette constatation amène à s'interroger sur la présence d'asymétries régionales dans le degré de résilience du secteur bancaire face aux chocs systémiques.

Classification JEL : G2, N2
Classification de la Banque : Institutions financières

1. Introduction

In the past two decades, developed and developing countries have experienced significant episodes of systemic banking crises, which have been more costly, in terms of fiscal costs, in developing areas than in industrial economies; thus, the prevention of such recurrent episodes has become a priority of policy.[1] The most acute among the recent experiences were the financial and banking problems in some emerging markets (EMs) during the nineties, which renewed interest in academic and policy circles regarding the role that individual bank weaknesses, in terms of their fundamentals, play in contributing to bank failures. Even though there is an extensive theoretical literature on bank failures, however, there is no systematic cross-country empirical evidence using bank-level data on EMs to assess the role of bank-level fundamentals.[2] Most studies that analyze bank failures at the bank level focus on the experience of the U.S. commercial banking industry, even though most of the recent episodes of systemic banking crises have not occurred in developed countries. In this context, this paper contributes to the literature by developing the first comparative empirical study using bank-level data that take into account the recent episodes of systemic banking crises in East Asia and Latin America, in order to address the following two questions: (i) To what extent did individual bank conditions explain bank failures? (ii) Did mainly the weakest banks, in terms of their fundamentals, fail in the crisis countries?

To address these questions, this paper studies the episodes of systemic banking crises in Latin America (Argentina, 1995; Mexico, 1994; and Venezuela, 1994) and East Asia (Indonesia, Korea, Malaysia, the Philippines, and Thailand in 1997) by gathering information from balance sheets and income statements on an annual basis for 14 EMs from the Bankscope database and countries' financial supervisory agency reports (eight East Asian countries: Indonesia, Korea, Malaysia, the Philippines, Thailand, Singapore, Hong Kong, and Taiwan; and six Latin American countries: Argentina, Chile, Colombia, Mexico, Peru, and Venezuela). The time span of the data covers the years from 1994 to 1999 for East Asia and from 1992 to 1996 for Latin America. First, I estimate the individual probabilities of bank failure as a function of bank-level fundamentals related to solvency, liquidity, profitability, and asset quality using cross-sectional multivariate logit models to assess whether bank-level heterogeneity is important for explaining cross-country differences in bank failures (i.e., whether crisis countries had weaker banks ex ante than non-crisis countries, rather than just having worse shocks ex post). Second, based on the estimated individual probabilities of bank failure (propensity scores), I analyze their distribution for failed and non-failed banks in the crisis countries, evaluating the degree of overlap between the distribution of both groups to assess

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[1] See Caprio and Klingebiel (2003). I follow the definition of systemic banking crises given by Sundararajan and Baliño (1991): "financial crisis is defined as a situation in which a significant group of financial institutions have liabilities exceeding the market value of their assets, leading to runs and other portfolio shifts, collapse of some financial firms, and government intervention."

[2] Some exceptions that study banking crises in EMs using bank-level data are González-Hermosillo (1999), Bongini, Claessens, and Ferri (2001), and Rojas-Suarez (2001).

whether mainly the weakest banks failed in those countries. I also compute the average of the propensity scores for failed and non-failed banks, to determine the relative contribution of only bank-level fundamentals to the likelihood of failure.[3]

The results for East Asia and Latin America show that bank-level fundamentals not only significantly affect the likelihood of bank failure, but also explain a high proportion of the likelihood of failure for failed banks (between 50 and 60 per cent). I find regional differences when I analyze the distribution of the estimated probabilities of failure. The results for East Asia show that in the crisis countries there is little overlap in the distribution of propensity scores between failed and non-failed institutions. This result suggests that systemic shocks—macroeconomic and liquidity shocks—mainly destabilized and put in distress the weakest banks ex ante, in terms of their fundamentals. The results for Latin America, however, show a significant overlap in the distribution of propensity scores between failed and non-failed banks in the crisis countries, which suggests that a fraction of relatively non-weak banks ex ante may have been forced to fail in the context of unexpected aggregate shocks to the system. When I take into account, through a survival time analysis, the effect of banking system and macroeconomic variables over the time of the crisis period, I find that the failure threshold of this group of relatively non-weak banks ex ante was shifting over the period, which explains the quality difference between failed and non-failed banks in Latin America.

This paper's main contributions to the literature are as follows. First, the paper extends and complements existing empirical studies, which focus mainly on macroeconomic factors at the origin of crisis, by identifying and comparing underlying patterns of individual bank conditions not only across countries but also across regions using bank-level data. Second, this paper evaluates the relevance of using traditional CAMEL[4]-type variables as indicators of near-term bank vulnerability for EMs, which have been applied mainly by developed economies. Third, the paper's results point towards further research on the role regional asymmetries play in the degree of banking sector resilience to systemic shocks (macroeconomic and liquidity shocks); i.e., whether the banking sector in Latin America is less able to withstand or absorb unexpected systemic shocks than the banking sector in East Asia.

The rest of this paper is organized as follows. Section 2 reviews the related theoretical and empirical literature on banking crises. Section 3 describes the data sources and variables. Section 4 describes the methodology and empirical evidence. Section 5 offers some conclusions.

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[3] Average propensity scores are calculated as the average of the individual estimated probabilities of bank failure for the group of failed and non-failed banks across crisis and non-crisis countries.

[4] CAMEL stands for Capital adequacy, Asset quality, Management, Earnings and profitability, and Liquidity.

2. Review of Related Literature

Gavin and Hausmann (1996) argue that systemic shocks undermine the viability of banks and create a crisis, but they do not completely explain banking crises. Bank failures result from the interaction of vulnerability and systemic shocks, where the weakest banks are the ones most likely to fail.[5] In their argument, "a bank is vulnerable when relatively small shocks to income, asset quality, or liquidity make the bank either insolvent or illiquid so that its ability to honor short term debt is brought into doubt" (p. 48). Banks become vulnerable because of bad managerial practices, reflected in the deterioration of banks' portfolio and capital structures before the onset of the crisis. According to Gavin and Hausmann, systemic shocks associated with macroeconomic or liquidity shocks play an important role in triggering a crisis by putting stress on insolvent and/or illiquid banks (i.e., systemic shocks push mainly the weakest banks ex ante to fail).

Chinn and Kletzer (2000) and Dekle and Kletzer (2001) provide theoretical models of financial crises in EMs where the source of the crises is the interaction between the microeconomics of private financial intermediation and government macroeconomic policies. The emphasis on the vulnerability of the banking sector bears much in common with the description and analysis of the East Asian crisis by Corsetti, Pesenti, and Roubini (1998). Their model is based on agency problems in the domestic financial intermediation of international capital flows that originate in an informational advantage for domestic banks in domestic intermediation, and government provision of guarantees and insurance. Within this framework, banks intermediate lending to firms that are subject to idiosyncratic productivity shocks, implying that firms will become insolvent with positive probability, in which event banks have the incentive to renegotiate a firm's debt. Banks not only accumulate increasingly risky assets, but also become progressively more indebted through foreign borrowing; under implicit guarantees, this constitutes a contingent liability for the government. In this context, the crisis evolves endogenously as banks become increasingly fragile, not only because of portfolio deterioration but also because of the reduction of the total equity value of the banking sector, in absolute terms and in proportion to the equity value of the borrowing firms.

Most of the empirical studies that try to identify the nature and origins of systemic banking crises in EMs focus mainly on macroeconomic factors and institutional variables.[6] The majority of empirical studies on banking failures that use bank-level data

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[5] Oviedo (2003) presents a theoretical model where bank failures are due exclusively to macroeconomic shocks; there is no relative deterioration of banks' portfolios and capital structures before the aggregate productivity shock.

[6] See Kaminsky and Reinhart (1999), Corsetti, Pesenti, and Roubini (1998), Radelet and Sachs (1998), and Demirgüç-Kunt and Detragiache (1998, 1999, and 2002). Some of the explanatory variables used in these studies are the rate of growth of GDP per capita, the change in terms of trade, the rate of change of the exchange rate, the real interest rate, the rate of change of the GDP deflator, the ratio of the central government budget surplus to GDP, the ratio of M2 to the foreign exchange reserves of the central bank, the ratio of domestic credit to the private sector to GDP, the ratio of bank liquid reserves to bank assets, the rate of change of the ratio of bank assets to

focus mainly on the U.S. commercial banking industry. Among the contributions in the past decade, Thomson (1991), Whalen (1991), Cole and Gunther (1995, 1997), and Gonzalez-Hermosillo (1999) develop empirical analyses of the contribution of bank fundamentals and of systemic and macroeconomic factors in different episodes of banking system problems in the United States: Southwest (1986–92), Northeast (1991–92), and California (1992–93). The common methodologies used by these authors are multivariate logit analysis and proportional hazard models; their main findings are that measures of bank solvency and risk, *proxied* by CAMEL-rating variables, explain the incidence of bank failures after controlling for aggregate factors.[7] Calomiris and Mason (2000) provide the first comprehensive econometric analysis of the causes of bank distress during the Great Depression. They construct a model of survival time and investigate the adequacy of bank fundamentals (measures of bank solvency and risk, related to the CAMEL-rating system) for the period 1930–33, after controlling for the effects of county, state, and national-level economic characteristics. They find that bank fundamentals explain most of the incidence of bank failure and argue that "contagion" or "liquidity crises" were a relatively unimportant influence on the risk of bank failure prior to 1933.[8]

To date, however, there is no systematic cross-country empirical evidence that evaluates the relative contribution of bank-level fundamentals in the context of the recent systemic banking crises in EMs during the nineties. The main contributors to the literature of bank failures in EMs using bank-level data are Gonzalez-Hermosillo (1999), Bongini, Claessens, and Ferri (2001), and Rojas-Suarez (2001).

Gonzalez-Hermosillo (1999) analyzes the role of bank-level fundamentals and macroeconomic factors for the Mexican banking crisis of 1994–95. She finds that all ex post measures of risk, and the loan-to-assets ratio, are associated with the probability and timing of failure. Bongini, Claessens, and Ferri (2001) investigate the occurrence of bank distress (i.e., whether the financial institution was recapitalized by the government, received liquidity support, was merged or acquired by another institution, or was intervened or closed by the government) and closure decisions in five East Asian

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GDP, a dummy variable for the presence of an explicit deposit insurance scheme, and an index of the quality of law enforcement. One exception is Honohan (1997), who performs a systematic evaluation of alternative indicators based on aggregate balance sheet indicators and indicators of macro cycles: the ratio of loans to deposits, the ratio of foreign borrowing to deposits, the growth rate of credit, the share of reserves to deposits, level of lending to the government, and level of central bank lending to the banking system.

[7] Earlier researchers are Sinkey (1975), Martin (1977), Barth et al. (1985), and Benston (1985). These authors seek to identify changes in bank-specific variables, related to the CAMEL-rating analysis, that lead to bank difficulties, and that therefore could be part of an early-warning system of banking problems.

[8] Calomiris and Mason (1997) analyze the banking failures during the Chicago panic of June 1932 using a methodology they again use in their paper of 2000. They conclude that failures during the panic reflected the relative weaknesses of failing banks in the face of a common asset-value shock, rather than contagion.

countries (Indonesia, Korea, Malaysia, the Philippines, and Thailand) in order to assess the role of both banks' "connections"—with industrial groups or influential families—and banks' micro-weaknesses in causing and resolving bank failures. Among their main findings, CAMEL-type variables, such as the ratios of loan-loss reserves to capital and of net interest income to total income, help predict subsequent distress; and "connections" increase the probability of distress and make closure more likely. Rojas-Suarez (2001) evaluates an alternative set of indicators based on "markets that work," rather than simply relying on accounting figures (CAMEL-type variables), in order to identify in advance impending banking problems. She finds, using bank-level data for six EM countries (Korea, Malaysia, Thailand, Colombia, Mexico, and Venezuela) and applying the "signal-to-noise approach" methodology used in the study of currency crises by Kaminsky and Reinhart (1999), that the capital-to-asset ratio has performed poorly as an indicator of banking problems in Latin America and East Asia. On the other hand, interest rates on deposits and spreads have proven to be strong performers.

While extremely informative, the first two of these studies (Gonzalez-Hermosillo 1999 and Bongini, Claessens, and Ferri's 2001) have three limitations as far as the objectives of this paper are concerned. First, case studies are interesting in their own right. One of my major goals, however, is to find common ground across different episodes of systemic banking crises; i.e., to find systematic underlying patterns that will allow me to make comparisons not only across countries but also across regions (Latin America and East Asia) about the relative contribution of bank-level fundamentals to the recent episodes of systemic banking crises. Policy-makers and financial regulators could use this information to develop a set of indicators of financial soundness in order to assess banking systems' strengths and vulnerabilities.

Second, Bongini, Claessens, and Ferri's (2001) analysis of the probability of distress does not include non-crisis countries in East Asia, which could introduce a bias in the results, in that crisis countries had more bank failures simply because they were affected by adverse aggregate shocks and not because of differences in ex ante bank fundamentals (crisis countries had weaker banks ex ante than non-crisis countries). Also, only a limited number of bank-level fundamentals are included in their estimation, not taking into account relevant measures such as the capital-to-assets ratio, the loans-to-assets ratio, and measures of liquidity. This also could introduce a bias, because not all sources of risk (market, credit, and liquidity) have been represented. Their definition of distress includes institutions that were merged or acquired by other financial institutions. Mergers and acquisitions, however, could be due to strategic reasons, rather than distress. In that sense, it is necessary to check the robustness of the results to the exclusion of their definition of distress.

Third, neither Gonzalez-Hermosillo (1999) nor Bongini, Claessens, and Ferri (2001) calculate the relative contribution of bank-level fundamentals to the probability of bank failure, or assess whether mainly the weakest banks in terms of their fundamentals failed during the crisis.

3. Data Description

In the case of East Asia,[9] financial statements for a sample of 444 banks have been gathered from Bankscope, a comprehensive database of balance sheet and income statement data for individual banks across the world. This information covers the period 1995–99 on an annual basis. Bankscope collects annual reports and financial statements from individual banks, which are prepared according to the various national accounting standards, and adjusts the reported data to make them as comparable as possible across countries.

The breakdown of data by countries is as follows: (i) 86 commercial banks and 3 other financial institutions in Indonesia,[10] (ii) 27 commercial banks and 28 other financial institutions in Korea, (iii) 41 commercial banks and 33 other financial institutions in Malaysia, (iv) 31 commercial banks and 5 other financial institutions in the Philippines, (v) 15 commercial banks and 26 other financial institutions in Thailand, (vi) 43 commercial banks and 96 other financial institutions in Hong Kong, (vii) 18 commercial banks and 39 other financial institutions in Singapore, and (viii) 36 commercial banks and 10 other financial institutions in Taiwan.

Coverage of the national financial sector in terms of total assets is high for all five East Asian crisis countries, and substantial in terms of the number of commercial banks for Malaysia and Thailand. In terms of total assets, the coverage of the total commercial banking system in my sample varies between 80 per cent and 100 per cent. The coverage of other financial institutions is between 47 per cent and 90 per cent. The coverage in terms of the number of commercial banks (local and foreign) is 35 per cent in Indonesia, 34 per cent in Korea, 100 per cent in Malaysia, 63 per cent in the Philippines, and 100 per cent in Thailand. In the case of other financial institutions, the coverage is 3 per cent in Indonesia, 49 per cent in Korea, 55 per cent in Malaysia, 5 per cent in the Philippines, and 27 per cent in Thailand.

In the case of Latin America, I assemble a database by gathering annual balance sheets and income statements for a sample of 307 banks for crisis countries (Argentina, Mexico, and Venezuela), as well as for non-crisis countries (Chile, Colombia, and Peru) for the period 1992–96.[11] The coverage of the financial information in terms of total assets is

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[9] In East Asia, Indonesia, Korea, Malaysia, the Philippines, and Thailand are the crisis countries, and Hong Kong, Singapore, and Taiwan are the non-crisis countries.

[10] Other financial institutions include finance companies in the case of Thailand; savings and investment banks and merchant banks in the case of Korea and Malaysia; savings banks in the case of the Philippines; and Islamic and investment banks in the case of Indonesia.

[11] Bankscope does not report financial information for banks that failed in Argentina, Mexico, and Venezuela during their respective crisis periods. For this reason, balance sheets and financial statements have been gathered separately for each crisis country from financial regulatory agencies. In this context, the coverage in terms of commercial banks is 100 per cent. For non-crisis countries, the information is obtained from Bankscope.

over 80 per cent for all the countries, because the banking sector covers a very high share of the financial system in Latin American countries. As of the end of 1994, the coverage in terms of total assets is 98 per cent in Argentina, over 80 per cent in Mexico, and 84 per cent in Venezuela. The breakdown of data by countries is as follows: (i) 171 commercial banks in Argentina, (ii) 27 commercial banks in Chile, (iii) 21 commercial banks in Colombia, (iv) 20 commercial banks in Mexico,[12] (v) 21 commercial banks in Peru, and (vi) 47 commercial banks in Venezuela.[13]

3.1 Description of the variables

Theoretical models that stress the role of bank-level fundamentals in instigating failures (Chinn and Kletzer 2000 and Dekle and Kletzer 2001) establish that, as a consequence of bad management, the probability of failure is an increasing function of bank asset risk and solvency (leverage). Chang and Velasco (1999, 2001) stress the role of bank liquidity. Bank-level variables that proxy for bank asset risk, liquidity, and solvency are thus needed in this analysis.

According to Sinkey (1975), bank financial ratios reflect the variation in bank asset risk and leverage, because they capture the market, credit, operational, and liquidity risk faced by banks. In this sense, bank balance sheets and income statements convey information about the ex post consequences of management's decisions (i.e., they provide an indirect measure of managerial performance).

The financial ratios used extensively in the empirical literature on the U.S. commercial banking industry are those related to the CAMEL rating system. Regarding asset risk, ratios of loan-loss reserves and loan-loss provisions over both total loans and capital are ex post measures of asset quality, and the ratio of total loans to total assets represents an ex ante measure of asset risk.[14] All of these ratios are expected to be positively related to the risk of bank failure. Bank profitability is also considered an ex ante measure of asset risk (FDIC 1997). Sustained levels of profitability allow the financial institution to

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[12] As of the end of 1994, there were 32 banks in Mexico. However, 12 banks report information only since 1994. For this reason, I take only banks that have at least one year of information previous to September 1994.

[13] See Appendix C for a detailed description of the data set, and Appendix F for a list of failed banks used in the estimations.

[14] The ratio of non-performing loans over total loans is another traditional measure of asset quality, but it is not used here because it cannot be found consistently for all the selected countries, and because this measure varies widely across countries due to different accounting standards. On the other hand, ratios of banks' portfolio concentration, which are related to ex ante bank asset risk, are not included due to data availability constraints.

increase its capital base and improve its viability, so profitability is negatively related to the risk of bank failure.[15]

Solvency is related to the ability to withstand shocks (i.e., how well a financial institution can absorb losses). An operative concept of solvency (positive net worth) is difficult to measure in practice, however, because the presence of non-marketable assets or the absence of liquid markets for some categories of bank assets make it difficult to obtain a consistent measure of a bank's asset value. In this context, solvency has been proxied by the extent of leverage, where the ratio of total capital (total equity plus loan-loss reserves) over total assets is the traditional measure of solvency used in the empirical literature.[16]

Two additional measures of bank solvency are introduced: the ratio of total capital (i) over total liabilities, and (ii) over total liabilities plus off-balance-sheet items. The measure of the extent of leverage using liabilities instead of assets provides a more sensible measure of the bank's buffer stock that will serve as a cushion to absorb losses, particularly since the latest banking crises involved not only shocks to bank assets, but also to the deposit base. In addition, the explicit inclusion of off-balance-sheet positions produces a more accurate measure of bank leverage and exposure (Breuer 2000). Moreover, this measure accounts for the fact that, as Sundararajan et al. (2002, 15) point out, "the rapid unwinding of positions, as all counter parties run for liquidity, is characterized by creditors demanding payment, selling collateral, and putting on hedges, while debtors draw down capital and liquidate other assets. This can result in extreme market volatility." All these alternative measures of solvency are negatively related to the risk of bank failure.

Regarding liquidity risk, the traditional indicator of bank liquidity is the ratio of liquid assets (cash and reserves, government bonds, and other marketable securities) over total assets as a measure of the maturity structure of the asset portfolio, which can reflect excessive maturity mismatches. On the other hand, given that liquid assets allow banks to meet unexpected deposit withdrawals, the liquidity of assets relative to liabilities is also a factor that affects the risk of bank failure (Calomiris and Mason 2000). For this reason, both ratios, which are negatively related to the risk of bank failure, are included in the empirical analysis.

Even though the existing theoretical literature does not consider bank size, measured by total assets, as a bank-level fundamental, it is included in my analysis to account for the fact that larger banks are better able to diversify their loan portfolio, thus reducing their

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[15] Exceptionally risky projects, however, could be associated with huge rates of return, so it is possible that, for some threshold, a high degree of profitability could be associated positively with the risk of failure (Gonzalez-Hermosillo, Pazarbasioglu, and Billing 1997).

[16] In particular, the risk-adjusted capital-asset ratio has been the traditional proxy for solvency. In 1988, the Basel Committee on Banking Supervision established a minimum standard of 8 per cent for this ratio.

asset risk (Calomiris and Mason 2000).[17] I also include bank ownership (foreign ownership) as an additional bank-level characteristic. Foreign banks are perceived as more stable and safer than domestic banks, because they may be able to resort to upstream financing from the mother institutions, which could contribute to stabilize the supply of credit, in particular during bad times, and they have a much more stable deposit base.[18]

Finally, because I am working with a cross-country sample, differences in the regulatory and institutional environment have to be taken into account. For that reason, I include a country indicator based on the variables of La Porta et al. (1998), which account for creditor and shareholder rights, efficiency of the judicial system, rule of law, and corruption.[19]

The use of financial ratios as proxies for fundamental bank attributes provides information about the *symptoms* rather than the *causes* of financial difficulty, in that they provide leading indicators of incipient crisis (Sinkey 1979). As a result, I focus on the near-term fragility (vulnerability) of the banks, and not on medium-to-longer-term vulnerabilities, which requires the identification and evaluation of potential structural weaknesses that can affect incentives to screen and monitor risks. At the operational level, this involves a review of the institutional structure, the legal and regulatory system, corporate governance, the nature of implicit and explicit guarantees, and the effect of financial reform or liberalization (Johnston, Chai, and Schumacher 2000).

4. Methodology and Empirical Evidence

Recall that this paper addresses two questions: (i) To what extent did individual bank conditions explain bank failures? (ii) Did mainly the weakest banks, in terms of their fundamentals, fail in the crisis countries? After providing a definition of failure, I evaluate whether bank-level heterogeneity is important for explaining cross-country bank failures (i.e., whether crisis countries had weaker banks ex ante than non-crisis countries, rather than simply having worse shocks ex post) by implementing mean tests on bank-level fundamentals and estimating the probability of bank failure using a cross-sectional

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[17] Also, "too-big-to-fail" policies could extend the survival time (reduce the probability of failure) of larger banks. Care is required with this interpretation, however, because bank size is not the only element involved in a "too-big-to-fail" policy; a measure of the bailout or the perception of bailout should also be considered.

[18] No foreign bank failed in the banking crises in East Asia and Latin America during the nineties. However, there was limited foreign bank participation in both regions before the onset of the crises, particularly in East Asia.

[19] This indicator is constructed by taking the arithmetic average of the values for each of the considered variables. A higher value of the indicator implies a much better regulatory and institutional environment. See Appendix B for the calculation.

multivariate logit model for East Asia and Latin America separately, including crisis and non-crisis countries. I then evaluate, based on the individual estimated probabilities of failure (propensity scores), the degree of overlap between the distribution of propensity scores of failed and non-failed banks in the crisis countries to assess whether mainly the weakest banks failed during the crisis period. In addition, I compute the average of the propensity scores for failed and non-failed banks, to determine the relative contribution of bank-level fundamentals to the likelihood of failure.

4.1 Definition of failure

Most empirical studies on banking failures consider a financial institution (bank) to have failed if it either received external support or was directly closed. In this paper, a financial institution will be considered to have failed if it fits into any of the following categories (Bongini, Claessens, and Ferri 2001; Gonzalez-Hermosillo 1999):

(i) the financial institution was recapitalized by either the central bank or an agency specifically created to address the crisis, and/or required a liquidity injection from the monetary authority;
(ii) the financial institution's operations were temporarily suspended ("frozen") by the government;
(iii) the government closed the financial institution;
(iv) the financial institution was absorbed or acquired by another financial institution.

These categories involve a broader concept of economic failure than the more restrictive concept of *de jure* failure (closure). One potential limitation is that category (iv) could include banks that were merged or absorbed for strategic reasons during the crisis period, and not due to insolvency reasons. As a result, a sensitivity analysis is performed that excludes this category.[20]

In the empirical analysis, a financial institution is considered to have failed if it fits into any of the above categories between 1997 and 1999 in the case of East Asia, between December 1994 and December 1996 in the case of Argentina and Mexico, and between January 1994 and December 1995 in the case of Venezuela.[21] Thirty-one per cent of the sample failed in East Asia and Latin America.

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[20] This classification was done by consulting central banks' annual reports and reviewing daily newspapers, in particular the *Asian Wall Street Journal* from March 1997 to August 1999. In addition, the information was cross-compared with two alternative databases assembled by Bongini, Claessens, and Ferri (2001) and Laeven (1999).

[21] The crisis period is defined from the onset of the crisis (time T): January 1997 (East Asia), January 1994 (Venezuela), and December 1994 (Argentina and Mexico) to two years subsequent to the onset (time T+1 and T+2).

4.2 Characteristics of failed and non-failed banks

I examine whether failed banks were similar ex ante to non-failed banks. In this context, mean tests of financial ratios are calculated separately prior to the onset of the crisis for both regions. Both CAMEL-type variables, which reflect the market, credit, operational, and liquidity risk faced by the banks, and market-based indicators (deposit interest rates and spreads), are analyzed. This analysis reveals only whether there were statistical differences between failed and non-failed banks; it does not isolate the contribution of particular variables to the probability or time of failure.

Tables 1 and 2 report mean tests for differences in bank-level fundamentals between failed and non-failed banks over the two-year period prior to the onset of the crises for East Asia and Latin America, respectively. In the case of East Asia, Table 1 reports the results for the whole sample of banks and for commercial banks only; results are similar for both samples. The results suggest that failed banks showed early signs of vulnerability before the onset of the crisis.

Regarding asset risk, failed banks showed a higher ratio of loan-loss reserves to total equity, and a higher ratio of loans to total assets, than non-failed banks (i.e., not only high lending but bad lending characterizes failed institutions).[22] With respect to solvency, failed banks showed a lower ratio of capital to total assets and total liabilities (even including off-balance-sheet items), with banks less able to absorb negative shocks given higher leverage. Regarding liquidity, failed banks showed a lower ratio of liquid assets to not only total assets but also to total liabilities, which made them less able to withstand unexpected deposit withdrawals. In addition, failed banks showed lower profitability (return on assets), which made them less able to increase their capital base and improve their viability. In the case of Latin America, the results in Table 2 resemble those for East Asia regarding asset risk, solvency, and profitability. Failed banks showed lower liquidity ratios than non-failed banks only in the period immediately before the onset of the crisis.

Following Rojas-Suarez (2001), two additional measures of the riskiness of individual banks based on market prices rather than accounting figures are analyzed: (i) the effects of interest rates (for loans and deposits), and (ii) interest rate spreads on the probability of bank failure, because such prices are a direct measure of the risk of bank default (Calomiris and Mason 1997).[23] An aggressive bidding for deposits could be associated with a higher likelihood of bank failure, because depositors demand high rates from banks that they perceive as risky; i.e., depositors could have information about bank

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[22] The results, however, do not show statistical differences in the ratios of loan-loss provisions. This could reflect accounting problems related to lax standards for loan classification and loan-loss provisioning, which were exposed during and after the crisis.

[23] The spread equals the difference between the loan interest rate and the implicit deposit interest rate. The loan interest rate is calculated as the ratio between interest income and total loans. The deposit interest rate is calculated as the ratio between interest expenses and total deposits.

vulnerability not captured by CAMEL-type variables, which would cause equilibrium deposit rates to be higher for institutions that depositors perceive as risky.

The results in Table 2 indicate that, up to two years before the onset of the crisis, the implicit deposit interest rate (spread) was higher (lower) for failed banks than for non-failed banks, whereas there were no statistical differences in the loan interest rate. In addition, the growth rate of real deposits was similar statistically for failed and non-failed institutions before the onset of the crisis. These facts would suggest that failed banks were bidding aggressively to attract deposits, which could also be consistent with a higher degree of risk-taking activities. Regarding spreads, Rojas-Suarez (2001) argues that narrow spreads should be interpreted differently in emerging markets than in industrial-country financial markets; in the latter, narrow spreads reflect efficiency, but in emerging markets they can indicate increased bank risk taking.

In the case of Latin America, the results show that, in the pre-crisis period, the implicit deposit interest rate was higher for failed banks than for non-failed banks, whereas there were not statistical differences in the growth rate of deposits.[24] These results suggest that failed banks had to offer higher returns to obtain financing for high-risk-taking activities before the onset of the crisis. In addition, the results show no statistical differences in spreads for the whole sample,[25] but a higher implicit interest rate on loans for failed banks than for non-failed banks in the period prior to the onset of the crisis.

4.3 Probability of failure: cross-sectional logit estimation

A cross-sectional multivariate logit model using CAMEL-type variables (that proxy for bank-level fundamentals) is estimated.[26] The dependent variable takes the value of 1 if the financial institution is identified in any of the categories of failure during the periods specified in section 4.1. I use as explanatory variables CAMEL-type variables associated with asset quality (the ratio of loan-loss provisions to the total loans and the ratio of total loans to assets), solvency (the ratio of total equity to total assets or liabilities), liquidity (the ratio of liquid assets to total liabilities), and profitability (the return on assets). I also include the logarithm of total assets to proxy for the size of the financial institution, a dummy of foreign bank ownership, and a country index of the regulatory and institutional environment. CAMEL-type variables are measured as of the end of 1996 for East Asia

[24] In the case of Venezuela, the rate of deposit growth was lower than the implicit deposit interest before the onset of the crisis, which implies a transfer problem (i.e., banks were transferring net resources to the depositors, reducing their profitability). See Gavin and Hausmann (1996).

[25] In the period preceding the onset of the crisis, spreads in Mexico and Venezuela are lower for failed banks than for non-failed banks, which is consistent with the results of Rojas-Suarez (2001) and supports the hypothesis that lower spreads reflect mainly risk-taking activities in the context of EMs. Spreads in Argentina, however, are higher for failed banks.

[26] See Appendix A (section A1) for details on the multivariate logit model.

(Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand), as of the end of 1993 for Venezuela, as of September 1994 for Argentina and Mexico, and as of December 1994 for Chile, Colombia, and Peru.[27]

Table 3 reports explanatory variables' marginal effects in the cross-sectional multivariate logit model for East Asia. According to the results, higher capital relative to assets or liabilities (even including off-balance-sheet items) is negatively associated with the probability of failure. A higher level of liquid assets relative to total liabilities and a higher return on assets reduce the probability of failure. A higher ratio of loans to total assets has a positive impact on failure. However, a measure of asset quality, loan-loss provisions over total loans, is not significant.[28] The latter suggests that lagging indicators of bank soundness are not good predictors of bank failures under lax standards for loan classification and loan-loss provisioning. In the East Asian crisis countries, loans were classified as bad loans only if they had been in arrears for six months or more, and banks would frequently restructure such loans to reduce the size of reported portfolio problems (Lindgren et al. 1999). The logarithm of total assets, a measure of size, is significant and has a negative sign, and the dummy of foreign ownership is significant and has a negative sign, which suggests that foreign banks—because they have much better risk-based management practices, capitalization, and access to parent funding—are able to reduce their probability of failure. Also, during times of crisis, foreign banks can provide an alternative location for deposits without involving capital outflows (i.e., foreign banks could have a much more stable deposit base). Finally, the indicator variable related to regulation has the expected sign (negative) and is significant, which implies that cross-country differences in the regulatory and institutional framework are associated with the probability of individual bank failure.

Table 4 reports results for Latin America, which resemble those obtained for East Asia; bank-level fundamentals have the correct sign and explain significantly the probability of failure. In addition, the size of the bank is negatively associated with the probability of failure, and the dummy of foreign ownership is significant and has a negative sign.[29]

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[27] Non-crisis countries in East Asia (Hong Kong, Singapore, and Taiwan) and Latin America (Chile, Colombia, and Peru) are included in the estimation, to examine the degree of overlap in bank-level fundamentals between crisis and non-crisis countries. In the case of Latin America, I perform a robustness check by including only Chile as a non-crisis country, given that Colombia and Peru were implementing structural reforms at that time. No significant qualitative differences arise. For this reason, results including Colombia and Peru are reported.

[28] In addition, an estimation using the ratio of loan-loss reserves to total loans was performed, and there were not qualitative differences.

[29] This result would support the "too-big-to-fail" hypothesis. This result, however, also could be related to the fact that larger banks are better able to diversify their loan portfolios, reducing their asset risk (Calomiris and Mason 2000).

However, the indicator variable related to regulation has the wrong sign (positive) and is not significant.[30]

In both regions, then, failed banks had particular characteristics prior to the onset of their respective systemic banking crises (i.e., bank-level heterogeneity is important for explaining the variation in failure rates).[31] From these results, however, I cannot conclude that all or almost all failed banks were observably weaker before the onset of the crisis (more vulnerable to negative asset-value shocks) than banks that survived the crisis. To address this issue, I analyze the distribution of propensity logit scores for failed and non-failed banks.

4.4 Distributional analysis of propensity scores

I re-estimate the cross-sectional multivariate logit model described in section 4.3 without the effect of the country indicator of institutional environment, to analyze the distribution of individual estimated probabilities of failure (propensity scores). The aim is to evaluate the degree of overlap between the distribution of failed and non-failed banks in the crisis countries, in order to assess whether mainly the weakest banks failed during the crisis period.[32] In addition, based on the previous estimation results, the average of the

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[30] Argentina, Colombia, Mexico, Peru, and Venezuela embarked in structural reforms at the beginning of the nineties, which makes it difficult to have a significant variation in the considered indicators between crisis and non-crisis countries. If I include only Chile in the group of non-crisis countries, however, I obtain similar results regarding bank-level characteristics and the right sign for the regulation index, but marginal significance (see Appendix D, Table D.1). Chile could be considered the benchmark of success in terms of the implementation of structural reforms in Latin America. Alternatively, an estimate was made including country dummies, instead of the country indicator of institutional environment. There were no qualitative changes in bank-level fundamentals regarding the previous results (see Appendix D, Table D.2).

[31] The previous results are based on a broad definition of failure that includes mergers and acquisitions (M&A), which could be done for strategic reasons and need not imply a form of failure. For this reason, I perform a sensitivity analysis that excludes from my broad definition of failure cases in which the financial institution was absorbed or acquired by another financial institution. The cross-sectional multivariate logit model for both regions shown in Tables 3 and 4 is distorted, particularly those results related to asset risk, where a higher ratio of loan-loss provisions to loans is negatively associated with the probability of failure, in the East Asian case. For Latin America, the ratio of total loans to total assets is not significant and has the wrong sign, and the liquidity ratio and profitability variable are not significant (see Appendix E, Tables E.2 and E.3). In addition, mean tests were performed between non-failed banks and banks that were M&A; the results show that there were statistical differences in measures of asset risk, solvency, liquidity, and profitability, which suggests that M&A banks had higher vulnerability than other non-failed banks (see Appendix E, Table E.1). All together, these results imply that being merged or acquired was part of a bailout policy, rather than a strategic decision, during the peak of the crisis period.

[32] To calculate the propensity scores, the cross-sectional multivariate logit estimation uses as explanatory variables CAMEL-type variables associated with asset quality (the ratio of loan-loss

propensity scores is computed using only bank-level fundamentals for failed and non-failed banks, to determine the relative contribution of bank-level fundamentals to the likelihood of failure.

Table 5a shows three main results for East Asia. First, the average of the propensity scores for non-failed banks in crisis countries was higher than that for non-failed banks in non-crisis countries.[33] This result suggests that the differences in the regulatory and supervisory environment in crisis countries could have given "incentives" to bank managers for high-risk-taking activities relative to non-crisis countries.[34] Second, the average logit propensity score of failed banks in crisis countries was higher than that of non-failed banks in non-crisis countries; only bank-level fundamentals explain 60 per cent of the probability of bank failure. This result implies that there were many fragile banks with particular ex ante (before the onset of the crisis) characteristics that made them more vulnerable to failure ex post. Third, in the crisis countries, there is little overlap in the distribution of logit propensity scores between failed and non-failed banks, which would imply that mainly the ex ante weakest banks failed in the crisis countries. Table 5b reports that 20 per cent of the distribution of propensity scores for failed banks is below the 75th percentile value of the distribution of logit scores for non-failed banks. This result suggests that systemic shocks—macroeconomic and liquidity shocks—mainly destabilized and put in distress the weakest banks ex ante, defined in terms of their fundamentals, which could reflect some degree of resilience in the banking sector.

Table 5a also shows the distribution of the propensity scores for Latin America. As in the case of East Asia, the average of the propensity scores for failed banks in crisis countries was higher than that for non-failed banks in non-crisis countries; bank-level fundamentals explain 53 per cent of the probability of failure. However, the average of the propensity scores for non-failed banks in crisis countries was similar to that for non-failed banks in non-crisis countries.[35] Finally, there is a significant overlap in the distribution of

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provisions to total loans and the ratio of total loans to assets), solvency (the ratio of total equity to total liabilities), liquidity (the ratio of liquid assets to total liabilities), and profitability (the return on assets). Also, the estimation includes the logarithm of total assets to proxy for the size of the financial institution, and a dummy for foreign bank ownership.

[33] The average degree of vulnerability for non-failed banks in crisis countries is even higher if the Philippines is removed from the sample of crisis countries. Among the crisis countries, the Philippines was less affected by the financial crisis in East Asia.

[34] In addition, mean tests were performed on non-failed banks between crisis and non-crisis countries. Non-failed institutions in crisis countries showed lower capitalization, profitability, liquidity, and spreads, and a higher ratio of loans over total assets, than non-failed banks in non-crisis countries up to two years before the onset of the crisis. This result suggests that non-failed banks in crisis countries had a higher degree of vulnerability than non-failed banks in non-crisis countries.

[35] In the case of Latin America, non-failed banks in crisis countries showed similar ratios of capitalization, profitability, and liquidity, but a higher ratio of loans over total assets than non-failed banks in non-crisis countries prior to the onset of the crisis. Non-failed banks in crisis

propensity scores between failed and non-failed banks in the crisis countries. Table 5b reports that 35 per cent of the distribution of propensity scores for failed banks is below the 75th percentile value of the distribution of propensity scores for non-failed banks.

A closer examination of the results for Latin America shows that the overlapping group (i.e., the group of failed banks that falls below the 75th percentile value of the distribution of logit propensity scores for non-failed banks) can be divided into two groups with different characteristics: one (covering 30 per cent of the banks in the overlapping group) where failed banks have a probability of failure of between zero and 0.3, and another (covering 70 per cent of the banks in the overlapping group) with failure probabilities between 0.3 and 0.47, where 0.47 is the 75th percentile value of the distribution of logit scores for non-failed banks. Tables 6a and b report that the first group of failed banks with the lowest probabilities of failure (between zero and 0.3) were in a much better position, in terms of their fundamentals, than the rest of the failed banks above the 25th percentile value of the distribution of logit scores for failed banks, and that they did not show significant differences relative to the group of non-failed banks. The group of failed banks with probabilities of failure between 0.3 and 0.47 had a lower ratio of total loans and a lower liquidity ratio than the rest of the failed banks above the 25th percentile value of the distribution of logit scores for failed banks.[36] This second group of failed banks, however, showed weaker bank-level fundamentals than the group of non-failed banks. In this sense, the second group of failed banks was in an intermediate zone between healthier and non-healthier banks before the onset of the crisis.

This significant overlap would suggest that, in Latin America, systemic shocks during the crisis period not only destabilized and put in distress the weakest banks ex ante, but also the weakest banks non-ex ante, in terms of their fundamentals, particularly banks that were in an intermediate financial situation between ex ante healthier and ex ante non-healthier banks. To determine whether macroeconomic and banking system variables associated with macroeconomic and liquidity shocks affected the probability of bank failure during the crisis period, a survival time model for Latin America is estimated, using the same set of bank-level variables, and including banking system and macroeconomic variables, which also could explain early and late bank failures during the crisis periods.[37]

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countries, however, had a higher average logit propensity score than non-failed banks in non-crisis countries when only Chile was included in the group of non-crisis countries.

[36] Also, they showed a higher ratio of solvency and higher profitability, but were not significantly different from the rest of the failed banks above the 25th percentile value of the distribution of logit scores.

[37] Given that an exact record of the specific dates of each bank failure is available, each financial institution's monthly failure can be modelled as a function of bank-level fundamentals, banking system, and macroeconomic variables. The macroeconomic variables used in the estimation capture the effect of real exchange rate volatility and economic activity. The real exchange rate volatility is calculated as the monthly average of the standard deviation of the real effective exchange rate reported by the International Financial Statistics, International Monetary Fund. Economic activity is proxied by GDP growth. The banking system variable used to proxy for

The cross-sectional logit estimation, unconditional probability of failure, assumes that bank-level fundamentals (as of the end of 1993, September 1994, and December 1994) accurately reflect unchanging cross-sectional differences in bank conditions throughout the period January 1994–December 1995 for Venezuela, and December 1994–December 1996 for Argentina and Mexico. This assumption might not be correct, however, because the crisis period in Latin America, as in East Asia, witnessed a continuous deterioration in asset values, implying that the failure threshold for banks was shifting over that period; i.e., declining fundamentals can explain the quality difference between early and late bank failures during the crisis periods (Calomiris and Mason 1997). This approach, the survival time model, allows for changes in the underlying transition probabilities during the crisis period.[38]

Table 7 reports that not only bank-level fundamentals, but also banking system and macroeconomic variables, explain significantly the timing of bank failure during the crisis period, and that coefficients of bank-level fundamentals related to asset quality (total loans over total assets), solvency, liquidity, size, and ownership are of the predicted sign and significantly explain the time of survival. Higher lending relative to assets is positively associated with the timing of failure. Moreover, higher capitalization (relative to assets and liabilities) is negatively associated with the timing of failure. In addition, higher liquid assets relative to total assets are negatively associated with the timing of failure, and larger banks are associated with longer survival, which could be consistent with the "too-big-to-fail" hypothesis; foreign ownership is negatively associated with the timing of failure, and the ex post measure of asset quality, the ratio of loan-loss provisions to total loans, is not significant.

Regarding the banking system and macroeconomic variables, the measure of banking system liquidity, which could capture potential contagion effects, is positively associated with the bank survival time in all specifications (i.e., higher liquidity relative to deposits outside the bank gives positive spillovers, increasing the bank's survival time). A higher volatility in the real effective exchange rate index is associated with a lower survival time. As expected, increases in the economic activity are positively associated with the time of survival. This result implies that declining bank-level fundamentals, given a deterioration in the economic environment, explain the quality difference between early and late bank failures during the crisis period in Latin America, where banks with weak fundamentals before the onset of the crisis failed at the beginning of the crisis period and

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liquidity risk is based on Diamond and Rajan (2002), who argue that contagion effects could be caused not only by contractual or asymmetric information links, but also by bank failures that lead to a contraction in the common pool of liquidity; this negative spillover effect would raise the likelihood that other banks will fail. In this context, domestic liquidity risk is proxied by the total amount of liquidity relative to the total deposits outside the bank (i.e., the amount of cash in the vaults of the other banks in the system—the summation over the n-1 banks—over the total amount of deposits in the other banks in the system—the summation over the n-1 banks) as a measure of liquidity in the banking system.

[38] See Appendix A (Section A2) for a detailed description of the survival time model.

banks with non-weak or relatively weak fundamentals at the onset of the crisis failed later.[39]

5. Conclusions

The results for East Asia and Latin America show that bank-level fundamentals not only significantly affect the likelihood of bank failure, but also explain a high proportion of the likelihood of failure for failed banks (between 50 and 60 per cent). These results support the view that failed banks in the systemic banking crises in EMs during the nineties suffered from fundamental weaknesses in their asset quality, liquidity, and capital structures prior to the onset of the crisis. Bank-level fundamentals, however, are not enough to explain cross-country differences in crisis outcomes. As shown by the survival time analysis, banking system and macroeconomic variables also explain the likelihood of failure.

Regional differences appear in the distribution analysis of the estimated probabilities of failure. The results for East Asia show that, in the crisis countries, there is little overlap in the distribution of propensity scores between failed and non-failed institutions. This result suggests that systemic shocks—macroeconomic and liquidity shocks—mainly destabilized and put in distress the weakest banks ex ante, in terms of their fundamentals. The results for Latin America, however, show a significant overlap in the distribution of propensity scores between failed and non-failed banks in the crisis countries, which would suggest that a fraction of ex ante (before the onset of the crisis) relatively non-weak banks may have been forced to fail in the context of unexpected aggregate shocks to the system. A survival time analysis of banking system and macroeconomic variables throughout the crisis period shows that the failure threshold of this group of ex ante relatively non-weak banks was shifting over the period; this result explains the quality difference between failed and non-failed banks in Latin America.

These results point towards room for further research on the role regional asymmetries play in the degree of banking sector resilience to systemic shocks (macroeconomic and liquidity shocks); i.e., whether the banking sector in Latin America is less able to withstand or absorb unexpected systemic shocks than the banking sector in East Asia. Using banking system and macroeconomic variables, Kaminsky and Reinhart (1998) find that East Asia and Latin America have different regional patterns of banking crises. Systemic banking crises in Latin America have been more volatile and severe than those in East Asia.

In terms of policy recommendation, these results suggest that financial system supervision in EMs could be strengthened by putting emphasis on traditional financial ratios associated with the CAMEL-rating system, at least as near-term indicators of bank vulnerabilities. The latter does not preclude the use of market-based indicators (e.g., deposit interest rates and interest rate spreads) as indicators of bank vulnerabilities,

[39] Survival time was not analyzed for the East Asian case because of data limitations. In many cases, even when banks failed in 1998 or 1999, the database reports information only until 1996.

forming the basis of an early-warning system of banking problems. In addition, these results stimulate discussion at the policy-maker level of the relevance of financial regulators disclosing information to build up a more effective market discipline as a component of the regulatory framework. Financial institutions should make general types of public disclosure, including the capital held as a buffer against losses, risk exposures (credit, market, and operational risks), risk assessment and management processes, and the capital adequacy of the institutions, in order to allow market participants (e.g., depositors) to assess the bank's ability to absorb aggregate shocks and remain solvent.

Given that macroeconomic and banking system variables affect the probability and timing of bank failure, banking regulation and supervision should also take into account the influence of macroeconomic developments on individual banks (i.e., assess the financial institution's exposure to systemic shocks) in order to make the banking (financial) system more robust to systemic shocks. In this sense, it will not only be necessary to continue with the implementation of macro-prudential analysis in the context of banking supervision and the Financial System Assessment Programs (FSAPs), but also to reform the regulatory framework, ensuring that bank exposures to macroeconomic sources of risk are properly accounted for. This would include, for example, open positions in foreign currency, exposure to a particular economic sector, and minimum liquidity requirements (Rochet 2004).

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Table 1: Mean Tests for East Asia[1]

I. Asset Quality

a. Full Sample[2]

Variable	Dec. 1995		Dec. 1996	
	Non-Failed	Failed	Non-Failed	Failed
Loan-loss provisions/Total equity	3.61	5.02***	3.66	4.85***
Loan-loss provisions/Total loans	0.54	0.64	0.52	0.56
Loans/Total assets	58.00	67.14***	57.66	66.38***

*** indicates significant differences between failed and non-failed financial institutions at the 1 per cent level.

b. Commercial Banks

Variable	Dec. 1995		Dec. 1996	
	Non-Failed	Failed	Non-Failed	Failed
Loan-loss provisions/Total equity	3.89	5.52***	3.55	5.15***
Loan-loss provisions/Total loans	0.55	0.67**	0.49	0.58*
Loans/Total assets	61.09	68.95***	60.41	68.74***

***, **, * indicate significant differences between failed and non-failed financial institutions at the 1, 5, and 10 per cent level, respectively.

II. Solvency

a. Full Sample

Variable	Dec. 1995		Dec. 1996	
	Non-Failed	Failed	Non-Failed	Failed
Total equity/Total assets	12.73	9.79***	13.59	9.10***
Total equity/Total liabilities	13.62	10.96***	14.33	10.31***
Total equity/(Total liabilities + Off-balance-sheet items)	11.77	9.58***	12.59	8.82***

*** indicates significant differences between failed and non-failed financial institutions at the 1 per cent level.

b. Commercial Banks

Variable	Dec. 1995		Dec. 1996	
	Non-Failed	Failed	Non-Failed	Failed
Total equity/Total assets	11.82	9.07***	12.25	8.59***
Total equity/Total liabilities	13.39	10.26***	13.31	9.62***
Total equity/(Total liabilities + Off-balance-sheet items)	11.26	8.75***	11.54	8.09***

(continued)

*** indicates significant differences between failed and non-failed financial institutions at the 1 per cent level.

[1] The sample of countries for East Asia includes Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand. The sample of banks is divided between failed and non-failed banks. A financial institution (bank) is considered to have failed if it fits into any of the following categories: (i) the financial institution was recapitalized by either the central bank or an agency specifically created to address the crisis or by a strategic investor, and/or required a liquidity injection from the monetary authority, (ii) the financial institution's operations were temporarily suspended ("frozen") by the government, (iii) the government closed the financial institution, and (iv) the financial institution was absorbed or acquired by another financial institution.

[2] Commercial banks and other financial institutions (finance companies, merchant banks, savings banks, and Islamic banks), totalling 444 financial institutions (304 commercial banks and 140 other financial institutions).

Table 1: Mean Tests for East Asia[1] (continued)

III. Liquidity

a. Full Sample[2]

Variable	Dec. 1995		Dec. 1996	
	Non-Failed	Failed	Non-Failed	Failed
Liquid assets/Total assets	21.08	17.63***	20.08	17.78***
Liquid assets/Total liabilities	23.49	19.52***	22.48	19.16***

*** indicates significant differences between failed and non-failed financial institutions at the 1 per cent level.

b. Commercial Banks

Variable	Dec. 1995		Dec. 1996	
	Non-Failed	Failed	Non-Failed	Failed
Liquid assets/Total assets	23.47	18.81***	21.59	19.37*
Liquid assets/Total liabilities	25.28	20.70***	23.83	21.15**

***, **, * indicate significant differences between failed and non-failed financial institutions at the 1, 5, and 10 per cent level, respectively.

IV. Earnings and Profitability

A. Full Sample

Variable	Dec. 1995		Dec. 1996	
	Non-Failed	Failed	Non-Failed	Failed
Net interest margin	3.49	3.42	3.58	3.32*
Return on assets	1.53	1.04***	1.54	0.99***

*** and * indicate significant differences between failed and non-failed financial institutions at the 1 and 10 per cent level, respectively.

b. Commercial Banks

Variable	Dec. 1995		Dec. 1996	
	Non-Failed	Failed	Non-Failed	Failed
Net interest margin	3.85	3.80	3.93	3.65
Return on assets	1.48	1.03***	1.43	1.04***

*** indicates significant differences between failed and non-failed financial institutions at the 1 per cent level.

V. Interest Rates and Deposits

a. Full Sample

Variable	Dec. 1995		Dec. 1996	
	Non-Failed	Failed	Non-Failed	Failed
Growth rate of deposits	11.53	18.85***	12.24	15.15
Loans interest rate	14.33	14.63	14.41	15.25
Deposit interest rate	8.24	10.34***	7.78	10.71***
Spread	6.42	4.92***	6.71	5.26***

*** indicates signficant differences between failed and non-failed financial institutions at the 1 per cent level.

b. Commercial Banks

Variable	Dec. 1995		Dec. 1996	
	Non-Failed	Failed	Non-Failed	Failed
Growth rate of deposits	16.47	17.48	16.34	16.86
Loans interest rate	14.68	15.29	14.54	15.69*
Deposit interest rate	7.53	10.26***	7.16	10.80***
Spread	6.48	4.94***	6.72	5.00***

*** and * indicate significant differences between failed and non-failed financial institutions at the 1 and 10 per cent level, respectively.

[1] The sample of countries for East Asia includes Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand. The sample of banks is divided between failed and non-failed banks. A financial institution (bank) is considered to have failed if it fits into any of the following categories: (i) the financial institution was recapitalized by either the central bank or an agency specifically created to address the crisis or by a strategic investor, and/or required a liquidity injection from the monetary authority, (ii) the financial institution's operations were temporarily suspended ("frozen") by the government, (iii) the government closed the financial institution, and (iv) the financial institution was absorbed or acquired by another financial institution.

[2] Commercial banks and other financial institutions (finance companies, merchant banks, savings banks, and Islamic banks), totalling 444 financial institutions (304 commercial banks and 140 other financial institutions).

Table 2: Mean Tests for Latin America[1]

Commercial Banks [2,3]

I. Asset Quality

Variable	*T*-2		*T*-1	
	Non-Failed	Failed	Non-Failed	Failed
Loan-loss provisions/Total equity	8.58	8.61	7.32	9.69*
Loan-loss provisions/Total loans	2.05	1.35	1.92	1.70
Total loans/Total assets	47.21	54.14***	48.62	55.46***

*** and * indicate significant differences between failed and non-failed financial institutions at the 1 and 10 per cent level, respectively.

II. Solvency

Variable	*T*-2		*T*-1	
	Non-Failed	Failed	Non-Failed	Failed
Total equity/Total assets	14.65	13.49	14.86	12.56**
Total equity/Total liabilities	17.18	16.52	18.89	15.16**

** indicates significant differences between failed and non-failed financial institutions at the 5 per cent level.

III. Liquidity

Variable	*T*-2		*T*-1	
	Non-Failed	Failed	Non-Failed	Failed
Liquid assets/Total assets	23.99	22.29	24.13	20.33**
Liquid assets/Total liabilities	27.78	25.82	26.38	23.26*

** and * indicate significant differences between failed and non-failed financial institutions at the 5 and 10 per cent level, respectively.

IV. Profitability

Variable	*T*-2		*T*-1	
	Non-Failed	Failed	Non-Failed	Failed
Return on assets	1.31	1.01	1.07	0.14***

*** indicates significant differences between failed and non-failed financial institutions at the 1 per cent level.

V. Interest Rates and Deposits

Variable	*T*-2		*T*-1	
	Non-Failed	Failed	Non-Failed	Failed
Growth rate of deposits	18.01	19.94	15.02	14.01
Loans interest rate	18.32	23.89***	18.99	21.44**
Deposit interest rate	9.92	12.02**	10.51	12.59*
Spread	11.19	14.43***	11.42	13.97**

***, **, * indicate significant differences between failed and non-failed financial institutions at the 1, 5, and 10 per cent level, respectively.

[1] The sample of countries for Latin America includes Argentina, Chile, Colombia, Mexico, Peru, and Venezuela.

[2] The sample of financial institutions for Latin America includes only commercial banks because they cover a very high proportion (over 80 per cent) of the financial system in terms of assets. There are 307 commercial banks in the sample.

The sample of banks is divided between failed and non-failed banks. A financial institution (bank) is considered to have failed if it fits into any of the following categories: (i) the financial institution was recapitalized by either the central bank or an agency specifically created to address the crisis or by a strategic investor, and/or required a liquidity injection from the monetary authority, (ii) the financial institution's operations were temporarily suspended ("frozen") by the government, (iii) the government closed the financial institution, and (iv) the financial institution was absorbed or acquired by another financial institution.

[3] *T*-1 represents Dec. 93 for Venezuela, Sep. 94 for Argentina and Mexico, and Dec. 94 for Chile, Colombia, and Peru. *T*-2 represents Dec. 92 for Venezuela, and Dec. 93 for Argentina, Chile, Colombia, Mexico, and Peru.

Table 3: Cross-Sectional Logit Estimation for East Asia[1]
(Marginal Effects)[2]

	(1)	(2)	(3)
Loan-loss provisions/Total loans	0.019	0.016	0.001
	0.615	*0.696*	*0.980*
Total loans/Total assets	0.007 **	0.006 **	0.006 **
	0.026	*0.027*	*0.026*
Total equity/Total assets	-0.033 ***		
	0.010		
Total equity/Total liabilities		-0.025 **	
		0.015	
Total equity/(Total liabilities + Off-Balance Sheet)			-0.019 *
			0.104
Liquid assets/Total liabilities	-0.011 ***	-0.011 ***	-0.010 ***
	0.008	*0.007*	*0.011*
Return on assets	-0.139 ***	-0.132 ***	-0.166 ***
	0.008	*0.010*	*0.001*
Log (Total assets)	-0.235 ***	-0.229 ***	-0.166 ***
	0.000	*0.000*	*0.000*
Foreign ownership	-0.855 ***	-0.841 ***	-0.897 ***
	0.000	*0.000*	*0.000*
Regulation index	-0.070 ***	-0.070 ***	-0.075 ***
	0.004	*0.003*	*0.003*
No. obs.	436	432	430
Wald Chi2	47.26	48.16	46.14
Prob > Chi2	0.00	0.00	0.00
Overall predicted power	81.16%	80.61%	79.93%

***, **, * indicate significant differences between failed and non-failed financial institutions at the 1, 5, and 10 per cent level, respectively.

[1] The estimation was done including crisis (Indonesia, Korea, Malaysia, the Philippines, and Thailand) and non-crisis (Hong Kong, Singapore, and Taiwan) countries. The dependent variable takes the value of 1 if the financial institution (FI) fits into the definition of failure given in Table 1 during the period Jan. 97–Jun. 99, and zero otherwise. Micro-level bank fundamentals, including the size of the FI, are measured as of December 1996. A constant term was included in the initial estimation.

[2] Marginal effects are reported, rather than the coefficients. The significance level is reported in italics below the marginal effects. The Z-statistics are based on robust (Huber and White) standard errors, which account for correlated observations in grouped data.

Table 4: Cross-Sectional Logit Estimation for Latin America[1]
(Marginal Effects)[2]

	(1)	(2)
Loan-loss provisions/Total loans	0.075 ***	0.076 ***
	0.000	*0.000*
Total loans/Total assets	0.006 **	0.006 **
	0.032	*0.044*
Total equity/Total assets	-0.016 ***	
	0.002	
Total equity/Total liabilities		-0.008 **
		0.020
Liquid assets/Total liabilities	-0.009 **	-0.010 **
	0.024	*0.022*
Return on assets	-0.066 **	-0.068 **
	0.048	*0.050*
Log (Total assets)	-0.068 ***	-0.061 **
	0.011	*0.023*
Foreign ownership	-0.310 ***	-0.317 ***
	0.000	*0.000*
Regulation index	0.142	0.160
	0.231	*0.188*
No. obs.	295	296
Wald Chi2	36.91	36.12
Prob > Chi2	0.00	0.00
Overall predicted power	74.35%	74.56%

*** and ** indicate significant differences between failed and non-failed financial institutions at the 1 and 5 per cent level, respectively.

[1] The estimation was done including crisis (Argentina, Mexico, and Venezuela) and non-crisis (Chile, Colombia, and Peru) countries. The dependent variable takes the value of 1 if the financial institution (FI) fits into the definition of failure given in Table 1 during the period Jan. 94–Dec. 95 for Venezuela, and Dec. 94–Dec.96 for Argentina and Mexico; it is zero otherwise.
Micro-level bank fundamentals, including the size of the FI, are measured as of December 1993 for Venezuela, as of September 1994 for Argentina and Mexico, and as of December 1994 for Chile, Colombia, and Peru. A constant term was included in the initial estimation.

[2] Marginal effects are reported, rather than the coefficients. The significance level is reported in italics below the marginal effects. The Z-statistics are based on robust (Huber and White) standard errors, which account for correlated observations in grouped data.

Table 5a: Distributional Analysis of Logit Propensity Scores for Failed and Non-Failed Banks[1]

	East Asia[2]				Latin America[3]			
	25th	Median	75th	Average	25th	Median	75th	Average
Non-Failed Banks								
(Non-crisis countries)								
Bank-level fundamentals [A]	0.004	0.058	0.290	**0.167**	0.093	0.258	0.497	**0.304**
(Crisis countries)								
Bank-level fundamentals [B]	0.010	0.155	0.467	**0.253**	0.134	0.298	0.467	**0.314**
Failed Banks								
Bank-level fundamentals [C]	0.516	0.668	0.781	**0.629**	0.410	0.559	0.651	**0.524**
Addendum (scores in crisis countries without the Philippines)								
Non-failed banks	0.013	0.377	0.586	**0.342**				
Failed banks	0.531	0.678	0.782	**0.641**				
t-statistics for test of differences								
[A], [B]				**2.466****				**0.224**
[A], [C]				**11.370*****				**7.265*****
[B], [C]				**12.389*****				**5.018*****

*** and ** indicate significant differences at the 1 and 5 per cent level, respectively.

[1] The logit propensity scores are calculated using only bank-level fundamentals: the loan-loss provisions ratio, the ratio of total loans to assets, the ratio of total equity to total liabilities, the ratio of liquid assets to total liabilities, the return on assets, bank size, and a dummy for ownership (foreign or domestic).

[2] Indonesia, Korea, Malaysia, the Philippines, and Thailand (crisis counties). Hong Kong, Singapore, and Taiwan (non-crisis countries).

[3] Argentina, Mexico, and Venezuela (crisis countries). Chile, Colombia, and Peru (non-crisis countries).

Table 5b: Distributional Analysis of Logit Propensity Scores for Failed and Non-Failed Banks in Crisis Countries

	East Asia		Latin America	
	Probability of failure Failed banks	Per cent of survivors estimated below that probability	Probability of failure Failed banks	Per cent of survivors estimated below that probability
Minimum	0.01429	0.27350	0.00573	0.00000
25th percentile	0.51561	0.75214	0.40964	0.66393
Median	0.66839	0.90598	0.55891	0.83607
75th percentile	0.78085	0.94872	0.65101	0.92623
Maximum	0.93399	1.00000	0.97770	1.00000

	East Asia		Latin America	
	Probability of failure Non-failed banks	Per cent of bank failures estimated below that probability	Probability of failure Non-failed banks	Per cent of bank failures estimated below that probability
Minimum	0.00000	0.00000	0.01170	0.01042
25th percentile	0.01037	0.00000	0.13413	0.06250
Median	0.15521	0.06087	0.29797	0.13542
75th percentile	0.46661	0.20870	0.46730	0.36458
Maximum	0.79152	0.69565	0.83389	0.93750

Table 6a: Mean Tests for Latin American Banks[1]

I. Asset Quality

Variable	Non-Failed	Failed (Group I)	Non-Failed	Failed (Group II)
Loan-loss provisions/Total loans	1.66	1.69	1.66	1.10
Total loans/Total assets	47.69	38.38*	47.69	59.72***

*** and * indicate significant differences between non-failed banks and failed banks (Group I) or between non-failed banks and failed banks (Group II) at the 1 and 10 per cent level, respectively.

II. Solvency

Variable	Non-Failed	Failed (Group I)	Non-Failed	Failed (Group II)
Total equity/Total assets	15.30	14.48	15.30	13.34
Total equity/Total liabilities	20.40	19.16	20.40	16.59

III. Liquidity

Variable	Non-Failed	Failed (Group I)	Non-Failed	Failed (Group II)
Liquid assets/Total assets	27.45	33.84	27.45	20.11**
Liquid assets/Total liabilities	33.51	43.27*	33.51	23.15***

***, **, and * indicate significant differences between non-failed banks and failed banks (Group I) or between non-failed banks and failed banks (Group II) at the 1, 5, and 10 per cent level, respectively.

IV. Profitability

Variable	Non-Failed	Failed (Group I)	Non-Failed	Failed (Group II)
Return on assets	0.97	0.81	0.97	0.55*

* indicates significant differences between Non-Failed banks and Failed banks (Group II) at the 10 per cent level.

[1] The sample of countries for Latin America includes Argentina, Mexico, and Venezuela.

Failed banks in group I include failed banks whose individual probabilities of failure are less than 0.3.

Failed banks in group II include failed banks whose individual probabilities of failure are between 0.3 and 0.47, where 0.47 is the 75th percentile value of the distribution of estimated probabilities for non-failed banks. 35 per cent of the distribution of estimated probabilities for failed banks is below that value (overlapping group).

Group I accounts for 30 per cent of the number of failed banks in the overlapping group and Group II accounts for the rest.

Table 6b: Mean Tests for Latin America[1]

I. Asset Quality

Variable	Failed (Group I)	Failed (Group III)	Failed (Group II)	Failed (Group III)
Loan-loss provisions/Total loans	1.69	1.50	1.10	1.50
Total loans/Total assets	38.38	71.32***	59.72	71.32***

*** indicates significant differences between failed banks (Group I) and failed banks (Group III) or between failed banks (Group II) and failed banks (Group III) at the 1 per cent level.

II. Solvency

Variable	Failed (Group I)	Failed (Group III)	Failed (Group II)	Failed (Group III)
Total equity/Total assets	14.48	11.91	13.34	11.91
Total equity/Total liabilities	19.16	13.88	16.59	13.88

III. Liquidity

Variable	Failed (Group I)	Failed (Group III)	Failed (Group II)	Failed (Group III)
Liquid assets/Total assets	33.84	18.19***	20.11	18.19
Liquid assets/Total liabilities	43.27	20.53***	23.15	20.53

*** indicates significant differences between failed banks (Group I) and failed banks (Group III) or between failed banks (Group II) and failed banks (Group III) at the 1 per cent level.

IV. Profitability

Variable	Failed (Group I)	Failed (Group III)	Failed (Group II)	Failed (Group III)
Return on assets	0.81	-0.12*	0.55	-0.12***

*** and * indicate significant differences between failed banks (Group I) and failed banks (Group III) or between failed banks (Group II) and failed banks (Group III) at the 1 and 10 per cent level, respectively.

[1] The sample of countries for Latin America includes Argentina, Mexico, and Venezuela.
Failed banks in group I include failed banks whose individual probabilities of failure are less than 0.3.
Failed banks in group II include failed banks whose individual probabilities of failure are between 0.3 and 0.47, where 0.47 is the 75th percentile value of the distribution of estimated probabilities for non-failed banks. 35 per cent of the distribution of estimated probabilities for failed banks is below that value (overlapping group).
Group I accounts for 30 per cent of the number of failed banks in the overlapping group and Group II accounts for the rest.
Failed banks in group III include failed banks whose individual probabilities of failure are higher than 0.47.

Table 7: Survival Time Model for Latin America[1,2]

Estimation Period: 1994–96 (Argentina, Mexico, Chile, Colombia, and Peru), 1993–95 (Venezuela). Annual data.

	(1)	(2)
Loan-loss provisions/Total loans	-0.003	0.000
	0.955	*0.999*
Total loans/Total assets	0.034 ***	0.036 ***
	0.001	*0.000*
Total equity/Total assets	-0.026 **	
	0.012	
Total equity/Total liabilities		-0.020 ***
		0.004
Liquid asset/Total liabilities	-0.031 *	-0.028 *
	0.056	*0.084*
Return on assets	-0.046	-0.044
	0.453	*0.490*
Log (Total assets)	-0.300 ***	-0.320 ***
	0.010	*0.007*
Foreign ownership	-0.982 *	-0.970 *
	0.103	*0.101*
Liquidity outside the bank[3]	-0.214 ***	-0.213 ***
	0.000	*0.000*
Real exchange rate volatility[4]	0.244 **	0.253 **
	0.032	*0.028*
GDP growth	-0.194 ***	-0.196 ***
	0.000	*0.000*
No. obs.	885	888
Wald Chi2	60.99	67.72
Prob > Chi2	0.00	0.00
p-Weibull[5]	3.11	3.12

[1] The financial institution's time of failure is estimated by fitting a parametric (time-varying) Weibull distribution with monotone hazard rates for the period 1996–99. The Huber-White robust estimator of variance is used to calculate corrected standard errors. The table reports estimated coefficients. If the sign of the coefficient is positive (negative), the variable is positively (negatively) associated with the financial institution's time of failure.

[2] The estimation includes crisis (Argentina, Mexico, and Venezuela) and non-crisis (Chile, Colombia, and Peru) countries.

[3] Total amount of liquidity relative to total deposits outside the bank; i.e., the amount of cash in vaults in the rest of the banks in the system (the summation over the n-1 banks) over the total amount of deposits in the rest of the banks in the system (the summation over the n-1 banks).

[4] The standard deviation of the monthly percentage variation of the real exchange rate index.

[5] An exponential distribution was not estimated because the maximum-likelihood estimator of p in the Weibull function is not close to 1.

Appendix A: Description of the Logit and Survival Time Model

A1. Logit Model

A qualitative response model is used to estimate the unconditional probability of the occurrence of distress as a function of a vector of explanatory variables, X, and a vector of unknown parameters, θ. The specific model is:

$$\Pr(Y_i=1) = F[H(X_i, \theta)],$$

where Y is the dependent variable, which takes the value of one if the financial institution has experienced distress, and zero otherwise;

F is the probability function, which has a logistic functional form, giving rise to the logit model:

$$H = \theta_0 + \Sigma_{j=1} \theta_j X_{ij}.$$

X is the vector of explanatory variables for the ith financial institution; and θ is the vector of parameters to be estimated. The basic equation of the logit model to be estimated can be written as:

$$\Pr(Y=1) = F[H(X, \theta)] = \frac{e^{\beta' x}}{1 + e^{\beta' x}}.$$

I use as explanatory variables CAMEL-type variables associated with asset quality (the ratio of loan-loss provisions to total loans and the ratio of total loans to total assets), solvency (the ratio of total equity to total assets or total liabilities), liquidity (the ratio of liquid assets to total liabilities), and profitability (return on assets). Also, I include the logarithm of total assets to proxy for the size of the financial institution, and a dummy of bank ownership. These variables are measured as of December 1996 for East Asia, September 1994 for Argentina and Mexico, December 1993 for Venezuela, and December 1994 for Chile, Colombia, and Peru. In addition, I include an indicator of the institutional environment, which varies by country.

A2. Survival Time Model

Regarding the question of whether an event is likely to end the "next period," the central concept is occupied not by the unconditional probability of an event taking place, but by its conditional probability. Survival time analysis allows the factors that explain the duration of a given state to be determined—in this case, the state of no distress. This duration is subject to random variations, and they form a distribution that is generally characterized by three mathematically equivalent functions: the survival function, the probability density function, and the hazard function.

The probability distribution of duration can be specified by the distribution function $F(t)$= $\Pr(T<t)$. The corresponding density function is $f(t) = dF(t)/dt$. In this context, the survivor function is given by:

$$S(t) = 1 - F(t) = \Pr(T \geq t),$$

giving the upper tail area of the distribution. The hazard function is:

$$\Lambda(t) = f(t) / S(t),$$

which is the instantaneous rate of leaving the state of no-distress per unit of period at t.[40] The common distributions used to derive the hazard function are: exponential, Weibull, log-logistic, and log-normal.

When I introduce explanatory variables, the effect of the regressors is to multiply the hazard function itself by a scale factor (the proportional hazard specification). The interpretation of the coefficients of the explanatory variables depends on the specification, and the sign of the coefficients indicates the direction of their effect on the conditional probability.

In the proportional hazard specification, the hazard function, which depends on a vector of explanatory variables, X, with unknown coefficients β and Λ_0 λ, is factored as:

$$\Lambda(t, X, \beta, \Lambda_0) = \Phi(X, \beta)\, \Lambda_0(t),$$

where Λ_0 is the "baseline" hazard corresponding to $\Phi(.) = 1$.[41] In this specification, the effect of explanatory variables is to multiply the hazard, Λ_0, by a factor, Φ, that does not depend on duration t.

A general specification of Φ is:

$$\Phi(X, \beta) = \exp(X'\beta).$$

The hazard function takes the following form:

$$\Lambda(t, X, \beta, \Lambda_0) = \exp(X'\beta)\, \Lambda_0(t).$$

In the case of a Weibull distribution, which is used in the estimations, the "baseline" hazard assumes that $\Lambda_0(t) = pt^{p-1}$, where p is the shape of the parameter to be estimated

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[40] A precise definition in terms of probabilities is:
$\Lambda(t) = \lim \Pr(t \leq T < t+h \mid T \geq t) / h$, as h goes to 0; i.e., the conditional probability that a financial institution that has occupied the state of no-distress for time t leaves it in the short interval of length dt after t.

[41] "It is common, and sensible, practice to measure the regressors so that $\Phi(.) = 1$ at the mean value of the regressors. Then Λ has an interpretation as the hazard function for the mean individual in the sample" (Kiefer 1988, p. 664).

from the data. A particular case of the Weibull function is the exponential hazard in which $p=1$.

The same set of bank-level fundamentals is used as in the cross-sectional logit estimation. In addition, I include a banking system variable, liquidity outside the financial institution, and macroeconomic variables, the real exchange rate volatility and GDP growth.

Appendix B: Calculation of Regulation Index

	(1) Rule of law	(2) Corruption	(3) Risk of expropriation	(4) Risk of contract repudiation	Average (1) - (4)
Indonesia	3.98	2.15	7.16	6.09	**4.38**
Korea	5.35	5.30	8.31	8.59	**6.71**
Malaysia	6.78	7.38	7.95	7.43	**7.71**
The Philippines	2.73	2.92	5.22	4.80	**4.08**
Thailand	6.25	5.18	7.42	7.57	**5.93**
Hong Kong	8.22	8.52	8.29	8.82	**8.77**
Singapore	8.57	8.22	9.30	8.86	**8.99**
Taiwan	8.52	6.85	9.12	9.16	**8.08**
Std. Dev.					**1.90**
Argentina	5.35	6.02	5.91	4.91	**5.64**
Chile	7.02	5.30	7.50	6.80	**6.77**
Colombia	2.08	5.00	6.95	7.02	**5.66**
Mexico	5.35	4.77	7.29	6.55	**5.99**
Peru	2.50	4.70	5.54	4.68	**4.83**
Venezuela	6.37	4.70	6.89	6.30	**6.15**
Std. Dev.					**0.64**

Law and Finance (La Porta et al. 1998)

Source of variables: International Country Risk Guide
Description of variables:

Rule of law:
Assessment of the law-and-order tradition in the country produced by the country-risk rating agency International Country Risk (ICR). Average of the months of April and October of the monthly index between 1982 and 1995. Scale from 0 to 10, with lower scores for less tradition for law and order (La Porta et al. 1998 changed the scale of this variable from its original range from 0 to 6).

Corruption:
ICR's assessment of the corruption in government. Lower scores indicate "high government officials are likely to demand special payments" and "illegal payments are generally expected throughout lower levels of government" in the form of "bribes connected with import and export licenses, exchange controls, tax assessment, policy protection, or loans." Average of the months of April and October of the monthly index between 1982 and 1995. Scale from 0 to 10, with lower scores for higher levels of corruption (La Porta et al. 1998 changed the scale of this variable from its original range from 0 to 6).

Risk of expropriation:
ICR's assessment of the risk of "outright confiscation" or "forced nationalization." Average of the months of April and October of the monthly index between 1982 and 1995. Scale from 0 to 10, with lower scores for higher risks.

Risk of contract repudiation:
ICR's assessment of the "risk of a modification in a contract taking the form of a repudiation postponement or scaling down" due to "budget cutbacks, indigenization pressure, a change in government or a change in government economic and social priorities." Average of the months of April and October of the monthly index between 1982 and 1995. Scale from 0 to 10, with lower scores for higher risks.

Appendix C: Description of Data Set

Table C.1: Bankscope Sample as of end of 1996: Overview of the Financial System

Category	Indonesia	Korea	Malaysia	Philippines	Thailand
Commercial banks	86 (20)	27 (1)	41 (14)	31 (7)	15 (0)
Other financial institutions	3 (0)	28 (0)	33 (0)	5 (0)	26 (1)
Total	89 (20)	55 (1)	74 (14)	36 (7)	41 (1)

Numbers in () indicate the number of foreign-owned financial institutions.
Source: Bankscope

Table C.2: Coverage of the Bankscope Sample as of end of 1996: In Terms of Assets (%)

Category	Indonesia	Korea	Malaysia	Philippines	Thailand
Commercial banks	94.7	99.0	100	88.0	100
Other financial institutions	58.0	58.7	62.5	60.2	89.6

Source: Bankscope and countries' central bank statistics

Table C.3: Coverage of the Bankscope Sample as of end of 1996: In Terms of Number of Financial Institutions (%)

Category	Indonesia	Korea	Malaysia	Philippines	Thailand
Commercial banks	86 (35%)	27 (34%)	37 (100%)	31 (63%)	15 (100 %)
Other financial institutions	3 (2%)	28 (49%)	31 (55%)	5 (5%)	26 (27%)

Source: Bankscope and countries' central bank statistics

Table C.4: Sample Frequency Distribution of Failed Banks

East Asia

Category	Sample	Per cent
Non-Failed	306	68.9
Failed	138	31.1
Total	444	100

Latin America

Category	Sample	Per cent
Non-Failed	201	68.7
Failed	96	31.3
Total	307	100

Table C.5: Distribution of Failed Banks across Crisis Countries

East Asia

Category	Indonesia	Korea	Malaysia	Philippines	Thailand
Failed	46	39	17	2	27
Commercial banks	44	21	7	1	10
Other financial institutions	2	18	10	1	17

Latin America

Category	Argentina	Mexico	Venezuela
Failed	65	13	18
Non-failed	106	7	29

Appendix D:

Table D.1: Cross-Sectional Logit Estimation for Latin America[1]

Including only Chile in the non-crisis country group.

(Marginal Effects)[2]

	(1)	(2)
Loan-loss provisions/Total loans	0.095 ***	0.095 ***
	0.000	*0.000*
Total loans/Total assets	0.005 *	0.004
	0.096	*0.127*
Total equity/Total assets	-0.016 ***	
	0.007	
Total equity/Total liabilities		-0.009 **
		0.026
Liquid assets/Total liabilities	-0.007 *	-0.007 *
	0.097	*0.080*
Return on assets	-0.078 *	-0.081 **
	0.059	*0.051*
Log (Total assets)	-0.056 *	-0.052 *
	0.061	*0.078*
Foreign ownership	-0.329 ***	-0.332 ***
	0.000	*0.000*
Regulation index	-0.246 *	-0.221
	0.083	*0.119*
No. obs.	253	254
Wald Chi2	37.43	37.10
Prob > Chi2	0.00	0.00
Overall predicted power	72.77%	72.64%

***, **, * indicate significant differences between failed and non-failed financial institutions at the 1, 5, and 10 per cent level, respectively.

[1] The estimation was done including crisis (Argentina, Mexico, and Venezuela) and non-crisis (Chile, Colombia, and Peru) countries. The dependent variable takes the value of 1 if the financial institution (FI) fits into the definition of failure given in Table 1 during the period Jan. 94–Dec. 95 for Venezuela, and Dec. 94–Dec.96 for Argentina and Mexico; it is zero otherwise.

Micro-level bank fundamentals, including the size of the FI, are measured as of December 1993 for Venezuela, as of September 1994 for Argentina and Mexico, and as of December 1994 for Chile, Colombia, and Peru. A constant term was included in the initial estimation.

[2] Marginal effects are reported, rather than the coefficients. The significance level is reported in italics below the marginal effects. The Z-statistics are based on robust (Huber and White) standard errors, which account for correlated observations in grouped data.

Table D.2: Cross-Sectional Logit Estimation for Latin America[1]
Using country dummies instead of regulation index.
(Marginal Effects)[2]

	(1)	(2)
Loan-loss provisions/Total loans	0.037 ***	0.035 ***
	0.092	*0.106*
Total loans/Total assets	0.005 **	0.005 **
	0.046	*0.054*
Total equity/Total assets	-0.012 ***	
	0.003	
Total equity/Total liabilities		-0.007 **
		0.020
Liquid assets/Total liabilities	-0.009 **	-0.010 **
	0.004	*0.002*
Return on assets	-0.110 **	-0.119 **
	0.001	*0.000*
Log (Total assets)	-0.078 ***	-0.079 **
	0.000	*0.000*
Foreign ownership	-0.213 ***	-0.218 ***
	0.000	*0.000*
Argentina	0.667 ***	0.665 ***
	0.000	*0.000*
Mexico	0.863 **	0.863 **
	0.050	*0.049*
Venezuela	0.911 **	0.913 **
	0.047	*0.045*
No. obs.	295	296
Wald Chi2	36.66	36.96
Prob > Chi2	0.00	0.00
Overall predicted power	76.96%	76.32%

*** and ** indicate significant differences between failed and non-failed financial institutions at the 1 and 5 per cent level, respectively.

[1] The estimation was done including crisis (Argentina, Mexico, and Venezuela) and non-crisis (Chile, Colombia, and Peru) countries. The dependent variable takes the value of 1 if the financial institution (FI) fits into the definition of failure given in Table 1 during the period Jan. 94 -Dec. 95 for Venezuela, and Dec. 94 -Dec 96 for Argentina and Mexico; it is zero otherwise.
Micro-level bank fundamentals, including the size of the FI, are measured as of December 1993 for Venezuela, as of September 1994 for Argentina and Mexico, and as of December 1994 for Chile, Colombia, and Peru. A constant term was included in the initial estimation.

[2] Marginal effects are reported, rather than the coefficients. The significance level is reported in italics below the marginal effects. The Z-statistics are based on robust (Huber and White) standard errors, which account for correlated observations in grouped data.

Appendix E: Robustness Check Excluding Mergers and Acquisitions of the Definition of Failure

Table E.1: Mean Tests between Non-Failed Banks and Merged or Acquired Banks[1]

I. Asset Quality

Variable	East Asia		Latin America	
	Non-Failed	M&A	Non-Failed	M&A
Loan-loss provisions/Total equity	3.66	4.90**	6.85	7.81
Loan-loss provisions/Total loans	0.61	0.54	1.76	1.08
Loan-loss reserve /Total equity	15.17	21.32**		
Loan-loss reserves/Total loans	2.39	2.38		
Total loans/Total assets	62.53	68.22*	53.37	69.23***

***, **, * indicate significant differences between non-failed and M&A financial institutions at the 1, 5 and 10 per cent level, respectively.

II. Solvency

Variable	East Asia		Latin America	
	Non-Failed	M&A	Non-Failed	M&A
Total equity/Total assets	13.77	8.37***	19.78	15.24**
Total equity/Total liabilities	14.33	9.45***	19.74	17.51
Total equity/(Total liabilities + Off-Balance-Sheet items)	12.33	8.24***		

*** and ** indicate significant differences between non-failed and M&A financial institutions at the 1 and 5 per cent level, respectively.

III. Liquidity

Variable	East Asia		Latin America	
	Non-Failed	M&A	Non-Failed	M&A
Liquid assets/Total assets	21.45	17.54*	26.08	16.62***
Liquid assets/Total liabilities	23.48	19.15*	24.43	19.45***

*** and * indicate significant differences between non-failed and M&A financial institutions at the 1 and 10 per cent level, respectively.

IV. Profitability

Variable	East Asia		Latin America	
	Non-Failed	M&A	Non-Failed	M&A
Return on assets	1.60	0.99***	1.08	-0.18***

*** indicates significant differences between non-failed and M&A financial institutions at the 1 per cent level.

V. Market-Based Indicators

Variable	East Asia		Latin America	
	Non-Failed	M&A	Non-Failed	M&A
Growth rate of deposits	16.28	17.68	13.03	14.19
Loans interest rate	14.81	12.62***	18.62	21.98**
Deposits interest rate	8.92	9.13	9.20	8.76
Spread	6.92	7.11	11.34	13.85***

*** and ** indicate significant differences between non-failed and M&A financial institutions at the 1 and 5 per cent level, respectively.

[1] The sample of countries for East Asia includes Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand. For Latin America, the sample includes Argentina, Chile, Colombia, Mexico, Peru, and Venezuela.

Table E.2: Cross-Sectional Logit Estimation for East Asia[1]

Excluding mergers and acquisitions of the definition of failure (Marginal Effects)[2]

	(1)	(2)	(3)
Loan-loss provisions/Total loans	-0.035	-0.023	-0.049
	0.460	*0.638*	*0.335*
Total loans/Total assets	0.003	0.004	0.004 *
	0.108	*0.107*	*0.078*
Total equity/Total assets	-0.037 ***		
	0.000		
Total equity/Total liabilities		-0.030 ***	
		0.000	
Total equity/(Total liabilities + Off-balance sheet)			-0.025 ***
			0.001
Liquid assets/Total liabilities	-0.008 ***	-0.009 ***	-0.008 ***
	0.005	*0.005*	*0.014*
Return on assets	-0.165 ***	-0.174 ***	-0.210 ***
	0.001	*0.000*	*0.000*
Log (Total assets)	-0.099 ***	-0.102 ***	-0.210 ***
	0.007	*0.006*	*0.008*
Regulation index	-0.116 ***	-0.119 ***	-0.125 ***
	0.000	*0.000*	*0.000*
No. obs.	436	432	430
Wald Chi2	68.98	67.54	68.15
Prob > Chi2	0.00	0.00	0.00
Overall predicted power	76.53%	76.37%	76.03%

*** and * indicate significant differences between failed and non-failed financial institutions at the 1 and 10 per cent level, respectively.

[1] The estimation was done including crisis (Indonesia, Korea, Malaysia, the Philippines, and Thailand) and non-crisis (Hong Kong, Singapore, and Taiwan) countries.

Bank-level bank fundamentals, including the size of the bank, are measured as of December 1996. A constant term was included in the initial estimation.

[2] Marginal effects are reported, rather than the coefficients. The significance level is reported in italics below the marginal effects. The Z-statistics are based on robust (Huber and White) standard errors, which account for correlated observations in grouped data.

Table E.3: Cross-Sectional Logit Estimation for Latin America[1]
Excluding mergers and acquisitions of the definition of failure
(Marginal Effects)[2]

	(1)	(2)
Loan-loss provisions/Total loans	0.022 ***	0.020 ***
	0.007	*0.012*
Total loans/Total assets	-0.001	-0.001
	0.343	*0.324*
Total equity/Total assets	-0.007 ***	
	0.005	
Total equity/Total liabilities		-0.005 ***
		0.003
Liquid assets/Total liabilities	-0.002	-0.001
	0.263	*0.283*
Return on assets	-0.006	-0.006
	0.547	*0.484*
Log (Total assets)	-0.001	0.000
	0.929	*0.996*
Foreign ownership	-0.071 **	-0.068 **
	0.012	*0.014*
Regulation index	0.057 *	0.058 *
	0.075	*0.064*
No. obs.	295	296
Wald Chi2	32.13	30.75
Prob > Chi2	0.00	0.00

***, **, * indicate significant differences between failed and non-failed financial institutions at the 1, 5, and 10 per cent level, respectively.

[1] The estimation was done including crisis (Argentina, Mexico, and Venezuela) and non-crisis (Chile, Colombia, and Peru) countries.
Bank-level fundamentals, including the size of the bank, are measured as of December 1993 for Venezuela, as of September 1994 for Argentina and Mexico, and as of December 1994 for Chile, Colombia, and Peru. A constant term was included in the initial estimation.

[2] Marginal effects are reported, rather than the coefficients. The significance level is reported in italics below the marginal effects. The Z-statistics are based on robust (Huber and White) standard errors, which account for correlated observations in grouped data.

Appendix F: List of Failed Banks

In the tables in this appendix, the failure code numbers signify the following:

1. The financial institution (bank) was recapitalized by either the central bank or an agency specifically created to address the crisis, and/or it required a liquidity injection from the monetary authority.

2. The financial institution's operations were temporarily suspended ("frozen") by the government.

3. The government closed the financial institution.

4. The financial institution was absorbed or acquired by another financial institution.

Date of failure	Failure code	Bank name	Country
Nov-97	3	Andromeda Bank	INDONESIA
Mar-99	3	Bank Arya Panduarta	INDONESIA
Mar-99	3	Bank Asia Pacific - ASPAC Bank	INDONESIA
Mar-99	3	Bank Bahari	INDONESIA
Mar-99	4	Bank Bali	INDONESIA
Mar-99	3	Bank BIRA - Bank Indonesia Raya	INDONESIA
Mar-99	1	Bank Bukopin	INDONESIA
Jan-98	4	Bank Bumi Daya (Persero) PT	INDONESIA
Aug-98	2	Bank Central Asia	INDONESIA
Mar-99	3	Bank Central Dagang	INDONESIA
Mar-99	3	Bank Dagang Dan Industri	INDONESIA
Jan-98	4	Bank Dagang Negara (Persero)	INDONESIA
Aug-98	2	Bank Danamon Indonesia Tbk	INDONESIA
Mar-99	2	Bank Duta	INDONESIA
Apr-98	2	Bank Ekspor Impor Indonesia - BankExim	INDONESIA
Mar-99	3	Bank First Indonesian Finance and Investments Corporation - Ficorinvest Bank	INDONESIA
Mar-99	1	Bank Internasional Indonesia Tbk	INDONESIA
Mar-99	3	Bank Lautan Berlian	INDONESIA
Mar-99	1	Bank Lippo Tbk	INDONESIA
Mar-99	3	Bank Mashill Utama	INDONESIA
Aug-98	3	Bank Modern	INDONESIA
Apr-98	2	Bank Nasional	INDONESIA
Dec-98	1	Bank Negara Indonesia (Persero) - Bank BNI	INDONESIA
Apr-98	2	Bank Nusa Internasional	INDONESIA
Mar-99	3	Bank Papan Sejahtera	INDONESIA
Dec-98	4	Bank Pembangunan Indonesia (Persero) - BAPINDO	INDONESIA
Mar-99	1	Bank Prima Express	INDONESIA
Mar-99	3	Bank Putra Surya Perkasa	INDONESIA
Dec-98	1	Bank Rakyat Indonesia	INDONESIA
Mar-99	2	Bank Rama	INDONESIA
Mar-99	3	Bank Sahid Gajah Perkasa	INDONESIA
Apr-98	3	Bank Subentra	INDONESIA
Apr-98	3	Bank Surya	INDONESIA
Aug-98	2	Bank Tiara Asia	INDONESIA
Aug-98	3	Bank Umum Nasional	INDONESIA
Mar-99	3	Bank Umum Servitia	INDONESIA
Mar-99	1	Bank Universal	INDONESIA
Mar-99	3	Hastin Internasional Bank	INDONESIA
Mar-99	2	JayaBank International	INDONESIA
Mar-99	3	Kharisma Bank	INDONESIA
Mar-99	1	PT Bank Niaga Tbk	INDONESIA
Nov-97	3	Sejahtera Bank Umum - Bank SBU	INDONESIA
Mar-99	2	Tamara Bank	INDONESIA
Apr-98	3	Bank Pelita	INDONESIA
Aug-98	2	Privat Development Finance Company of Indonesia - Bank PDFCI	INDONESIA

Date of failure	Failure code	Bank name	Country
Jan-99	4	Boram Bank	KOREA REP. OF
Apr-99	4	Chohung Bank	KOREA REP. OF
Jun-98	3	Chung Chong Bank Ltd. (The)	KOREA REP. OF
Apr-99	4	Chungbuk Bank Ltd	KOREA REP. OF
Jan-99	4	Commercial Bank of Korea	KOREA REP. OF
Jun-98	3	Daedong Bank	KOREA REP. OF
Jun-98	3	Donghwa Bank	KOREA REP. OF
Jun-98	3	Dongnam Bank	KOREA REP. OF
May-99	1	H&CB	KOREA REP. OF
May-99	1	Hana Bank	KOREA REP. OF
Jan-99	4	Hanil Bank	KOREA REP. OF
Jun-99	1	Industrial Bank of Korea	KOREA REP. OF
Sep-99	4	Kangwon Bank	KOREA REP. OF
May-99	1	Kookmin Bank (Old)	KOREA REP. OF
May-99	1	Koram Bank	KOREA REP. OF
Jan-98	2	Korea First Bank	KOREA REP. OF
Dec-98	4	Korea Long Term Credit Bank	KOREA REP. OF
Jan-98	3	Kyungki Bank Ltd.	KOREA REP. OF
Jan-98	2	Seoul Bank	KOREA REP. OF
May-99	1	Shinhan Bank	KOREA REP. OF
Dec-97	3	Coryo Merchant Bank	KOREA REP. OF
Dec-97	3	Daehan Investment Banking Corp.	KOREA REP. OF
Jun-99	1	Export-Import Bank of Korea	KOREA REP. OF
Dec-97	3	Gyongnam Merchant Banking Corporation	KOREA REP. OF
Dec-97	3	H&S Merchant Banking Corporation	KOREA REP. OF
Dec-97	3	Hansol Merchant Bank	KOREA REP. OF
Dec-97	3	Hanwha Merchant Bank	KOREA REP. OF
Feb-99	4	Hyundai International Merchant Bank HIMB	KOREA REP. OF
1999	4	Hyundai Securities Co. Ltd.	KOREA REP. OF
Jun-99	1	Korea Development Bank	KOREA REP. OF
Dec-98	4	Korea International Merchant Bank	KOREA REP. OF
Jul-99	4	LG Merchant Banking Corporation - LGMB	KOREA REP. OF
Dec-97	3	Nara Banking Corporation	KOREA REP. OF
Jul-99	3	National Livestock Cooperatives Federation	KOREA REP. OF
Dec-97	3	Saehan Merchant Banking Corp.	KOREA REP. OF
Dec-97	3	Samyang Merchant Bank	KOREA REP. OF
Dec-97	3	Shinhan Investment Bank	KOREA REP. OF
Oct-98	1	AmBank Group	MALAYSIA
Jun-99	4	Bank Bumiputra Malaysia Berhad	MALAYSIA
Nov-98	1	BSN Commercial Bank (Malaysia) Berhad	MALAYSIA
Jun-97	4	Chung Khiaw Bank (Malaysia) Bhd.	MALAYSIA
Oct-98	1	Oriental Bank Berhad	MALAYSIA
Nov-98	1	RHB Bank Berhad	MALAYSIA
Nov-98	1	Sabah Bank Berhad	MALAYSIA
Nov-98	4	AMFB Holdings Berhad	MALAYSIA

Date of failure	Failure code	Bank name	Country
Nov-98	1	AMMB Holdings Berhad	MALAYSIA
Nov-98	1	Arab-Malaysian Merchant Bank Berhad	MALAYSIA
Dec-99	4	BSN Merchant Bank BHD	MALAYSIA
Jun-99	4	Hock Hua Finance Berhad	MALAYSIA
Jan-99	4	Multi-Purpose Finance Berhad	MALAYSIA
Jan-98	4	RHB Finance Berhad	MALAYSIA
Nov-98	1	Southern Investment Bank Berhad	MALAYSIA
1999	4	TA Enterprise Berhad	MALAYSIA
Nov-98	1	United Merchant Group Bhd	MALAYSIA
Nov-98	1	Utama Merchant Bank Berhad	MALAYSIA
Jun-99	4	Philippine Commercial International Bank - PCIBank	PHILIPPINES
Jul-98	3	Mindanao Development Bank	PHILIPPINES
Aug-98	3	Bangkok Bank of Commerce Public Company Limited	THAILAND
Jan-98	2	Bangkok Metropolitan Bank Public Company Limited	THAILAND
Dec-98	1	Bank of Asia Public Company Limited	THAILAND
Aug-98	2	Bankthai Public Company Limited	THAILAND
Jan-98	4	DBS Thai Danu Bank Public Company Limited	THAILAND
Feb-98	2	First Bangkok City Bank	THAILAND
Feb-98	2	Siam City Bank Public Company Limited	THAILAND
Dec-98	1	Siam Commercial Bank Public Company Limited	THAILAND
Apr-99	4	Standard Chartered Nakornthon Bank	THAILAND
Aug-98	2	UOB Radanasin Bank Public Company Limited	THAILAND
Apr-99	1	Asia Credit Public Company Limited	THAILAND
Jun-97	3	CMIC Finance and Security PCL	THAILAND
Aug-98	2	Dhana Siam Finance & Securities	THAILAND
Jun-97	3	Finance One Public Company Limited	THAILAND
Jun-97	3	General Finance and Securities Ltd.	THAILAND
Aug-98	2	IFCT Finance and Securities PCL	THAILAND
Jun-97	3	ITF Finance and Securities PCL	THAILAND
Aug-98	4	Krungthai Thanakit PCL	THAILAND
Aug-97	3	Multi-Credit Corporation of Thailand PCL	THAILAND
May-98	2	Nava Finance & Securities Public Company Limited	THAILAND
Aug-97	3	SCF Finance and Securities PCL	THAILAND
Aug-97	3	Siam City Credit Finance and Securities PCL	THAILAND
May-99	1	Siam Industrial Credit Public Company Limited (The)	THAILAND
Aug-97	3	SITCA Investment and Securities PCL	THAILAND
Aug-97	3	SRI Dhana Finance and Securities PCL	THAILAND
Aug-97	3	Union Asia Finance Public Co. Ltd.	THAILAND
Aug-97	3	Wall Street Finance and Securities PCL	THAILAND

Date of failure	Failure code	Bank name	Country
Dec-95	4	Banesto Banco Shaw	ARGENTINA
Jul-96	4	Banco Popular Argentina SA	ARGENTINA
Jan-97	4	Banco Frances del Rio de la Plata SA	ARGENTINA
Dec-96	4	Banco Cooperativo de Caseros Limitado	ARGENTINA
Jul-96	4	The Chase Manhattan Bank, NA	ARGENTINA
Aug-96	4	Banco de San Juan SA	ARGENTINA
Sep-96	4	Banco Tornquist SA	ARGENTINA
May-95	4	Banco Cooperativo de la Plata Ltdo.	ARGENTINA
Dec-97	3	Banco Credito Provincial	ARGENTINA
Dec-96	4	Banco de Credito Comercial SA	ARGENTINA
Feb-95	4	Banco de Entre Rios SEM	ARGENTINA
Jul-96	4	Banco de la Provincia de Tucumán.	ARGENTINA
Jul-95	4	Banco Monserrat SA	ARGENTINA
Aug-98	4	Banco Rio de la Plata SA	ARGENTINA
Aug-96	4	Banco de Prevision Social SA	ARGENTINA
Nov-95	4	Banco Municipal de Parana SEMICFAI	ARGENTINA
Apr-96	4	Banco Commercial del Tandil SA	ARGENTINA
May-95	4	Banco Cooperativo del Este Argentino Ltdo.	ARGENTINA
Mar-95	4	Banco de Coronel Dorrego SA	ARGENTINA
Jul-95	4	Banco de Junin SA	ARGENTINA
Nov-95	4	Banco de Olavarria SA	ARGENTINA
Mar-95	4	Banco Rural (Sunchales) CL	ARGENTINA
May-97	2	Nuevo Banco de Azul SA	ARGENTINA
Jul-96	4	Banco Popular Financiero SA	ARGENTINA
Apr-97	4	Banco Union Commercial e Industrial CL	ARGENTINA
May-95	2	Banco del Noroeste CL	ARGENTINA
Jul-95	3	Banco Federal Argentino	ARGENTINA
Mar-96	4	Banco Interfinanzas SA	ARGENTINA
Feb-95	3	ACISO Banco CL	ARGENTINA
May-97	4	Banco Platense SA	ARGENTINA
May-95	4	Banco San Jose CL	ARGENTINA
Jul-95	4	Banco Cooperative Nicolas Levalle Ltdo	ARGENTINA
Apr-95	4	Banco del Ibera SA	ARGENTINA
Apr-95	4	Banco Coinag CL	ARGENTINA
May-95	4	Banco Nucleo CL	ARGENTINA
May-95	4	Banco de las Comunidades CL	ARGENTINA
Apr-95	4	Banco Noar CL	ARGENTINA
Jul-95	4	Banco Horizonte CL	ARGENTINA
Jun-95	4	Banco Aliancoop CL	ARGENTINA
Feb-95	4	Banco Nueva Era CL	ARGENTINA
Jun-95	4	Banco VAF CL	ARGENTINA
Apr-95	4	Banco Independcia CL	ARGENTINA
Aug-95	3	Banco Integrado Departmental CL	ARGENTINA
Jun-95	4	Banco C.E.S CL	ARGENTINA
Feb-95	3	Banco de la Ribera CL	ARGENTINA
Jul-95	4	Banco Meridional CL	ARGENTINA
Apr-95	4	Banco de los Arroyos CL	ARGENTINA

Date of failure	Failure code	Bank name	Country
Jun-95	4	Banco Carlos Pelligrini CL	ARGENTINA
Jun-95	4	Banco Nordecoop CL	ARGENTINA
Jun-95	4	Banco Local CL	ARGENTINA
Mar-97	4	Banco Coopesur CL	ARGENTINA
Mar-95	3	Banco Feigin SA	ARGENTINA
May-95	4	Banco Asfin SA	ARGENTINA
May-95	4	Banco Provencor SA	ARGENTINA
Feb-97	4	Banco Liniers Sudamericano SA	ARGENTINA
Feb-96	4	Banco Baires	ARGENTINA
Mar-96	4	Banco UNB SA	ARGENTINA
Jul-95	4	Banco Caudal SA	ARGENTINA
Jul-95	4	Banco del Fuerte SA	ARGENTINA
Feb-95	3	Banco Multicredito SA	ARGENTINA
Apr-95	3	Banco Austral SA	ARGENTINA
Nov-94	3	Banco Extrader SA	ARGENTINA
Nov-96	4	Banco de la Cuenca del Plata	ARGENTINA
Nov-94	4	Banco del Chaco SEM	ARGENTINA
Dec-95	4	Banco de la Provincia de Formosa	ARGENTINA
Jan-96	4	Banco de la Provincia de Missiones	ARGENTINA
Mar-96	4	Banco de la Provincia de Rio Negro	ARGENTINA
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